

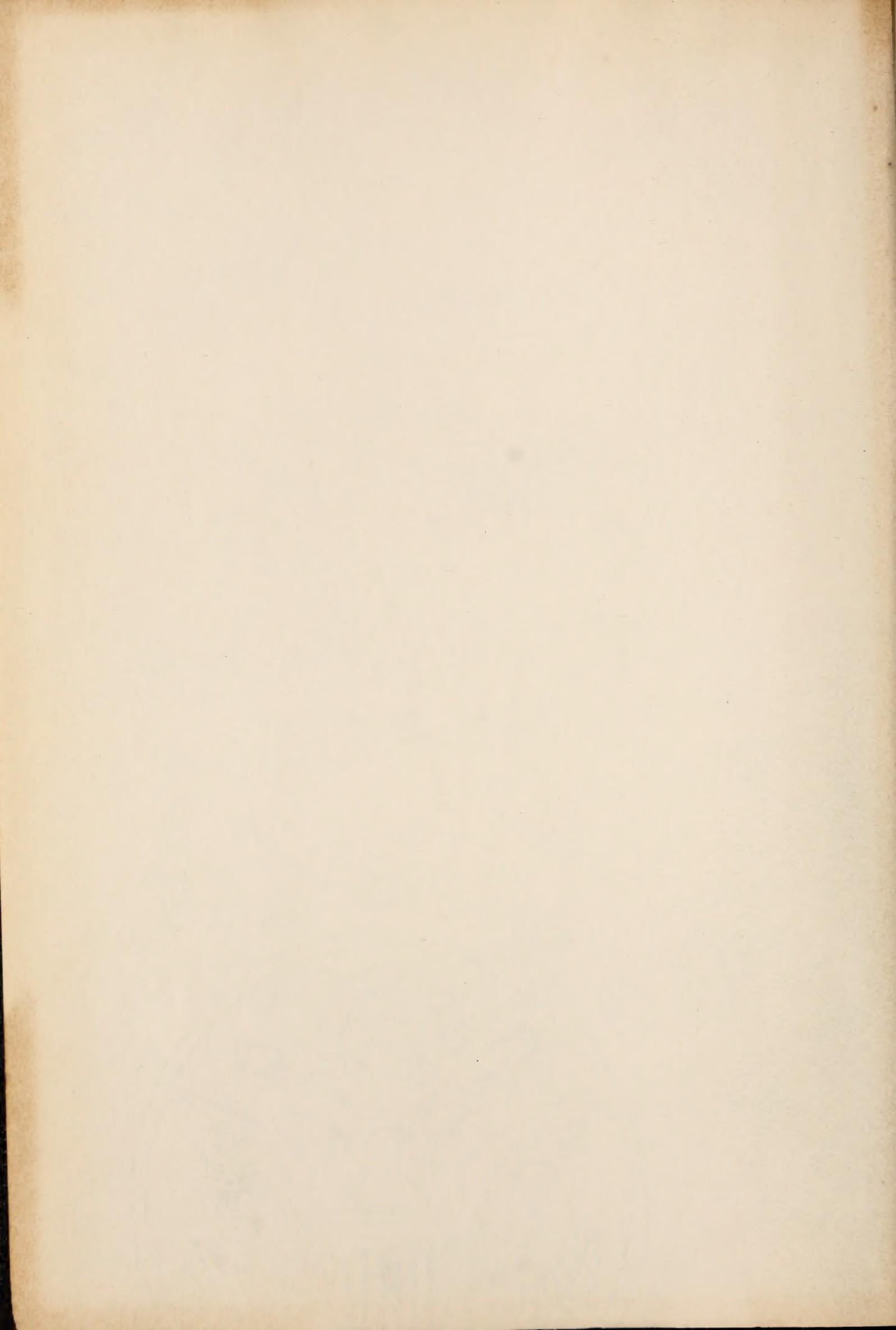
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Jan. - June 194



WEEKLY BULLETIN

OF THE OFFICE OF

WESTERN IRRIGATION AGRICULTURE,

BUREAU OF PLANT INDUSTRY,

U. S. DEPARTMENT OF AGRICULTURE.

U.S.D.A.
L.I.P.

Volume V.

Vol. V.

1.

3 January, 1914.

FIELD NOTES.

San Antonio.

Mr. Letteer has sent in some photographs showing some of the effects of the heavy rainfall during the early part of October. He states that the rainfall at the Experiment Farm during the period of heavy precipitation was as follows:

October 1	.....	2.20	inches.
2	.....	2.22	"
3	.....	0.46	"
4	.....	0.16	"
		<u>5.04</u>	"

During the same period, the rainfall at the city of San Antonio, six miles north of the farm, was considerably greater, as is shown below:

October 1	.....	5.96	inches.
2	.....	1.78	"
3	.....	0.38	"
4	.....	0.00	"
		<u>8.12</u>	"

It was on the morning of October 2 that the San Antonio River was highest, and that certain sections of the City were flooded.

Mr. Letteer states that "for the most part, the rains in the immediate vicinity of the Experiment Farm were not of a character to cause excessive erosion, especially on land with no more slope than the farm has, and in soil of the physical characteristics of ours. The greatest damage was done in the orchard in Field E3. This orchard lies in the low land which extends cross-wise of the farm, and the greater part of the erosion on this field was due to the water which drained from the Corpus Christi Road on the west side of the farm. Practically no washing took place on the fields which had only their own water to take care of. In the orchard, all of the loose soil was washed from an area about 100 by 250 yards. The loose soil was about 3 or

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San Antonio (continued).

4 inches thick, the thickness of the layer loosened by the orchard cultivator. The land had not been plowed for about three years".

Truckee-Carson.

FIELD NOTES.

During the week ending December 20, the maximum temperature was 48, minimum temperature 17, and precipitation .15 inch.

The work of laying drain tile along the south side of the "Y" series was continued throughout the week. During the latter part of the week, the progress was slow, owing to the presence of quicksand and the rapid inflow of water.

A cement horse trough was constructed in the corral to replace the old galvanized iron affair which had become leaky.

One man and 4 horses were employed in hauling earth from the sand hills to the west end of Field "C". The level of this part of the field will be raised about 10 inches.

Another shipment of dairy cattle has been received on the Project. The shipment contained 60 Holstein cows, 30 Jersey cows, and 4 pure bred Jersey bulls. The importation was financed by the Churchill Creamery Company.

Soluble Salts in the Soil of Plat Y - 16.

Soil samples were taken in Plat Y-16 on December 6 for the purpose of determining the carbonate and bicarbonate content of the upper two feet in order that the amount of sulphuric acid re-

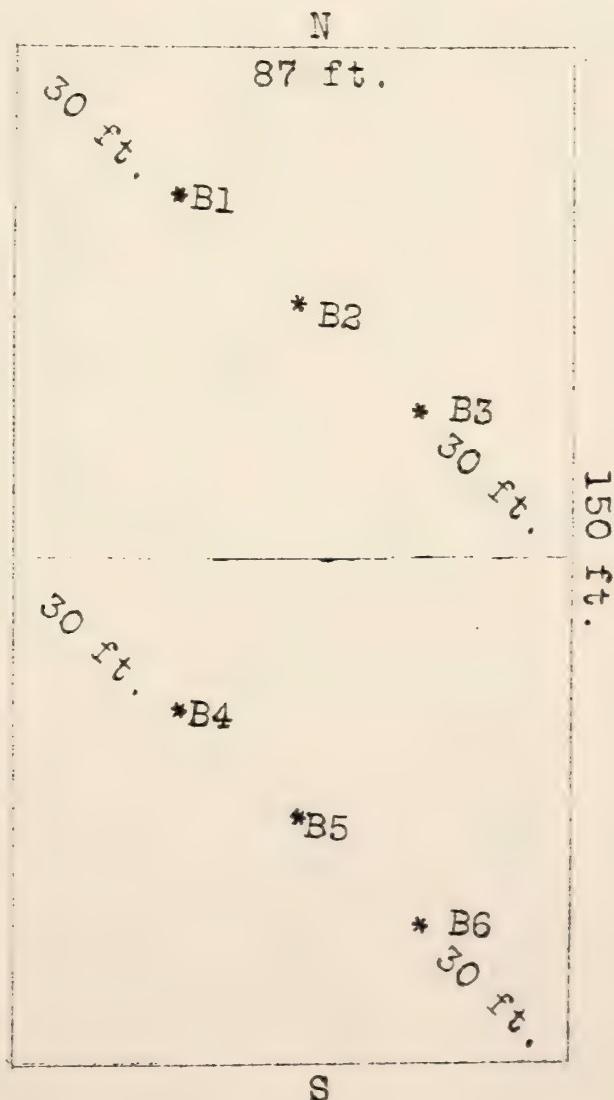
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Soluble Salts in the Soil of Plat Y16
continued.

quired to neutralize these salts might be calculated. The borings were made to a depth of three feet and a sample taken for each foot. Six borings were made, located as shown in the following diagram:



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Soluble Salts in the Soil of Plat Y-16.
(continued).

TABLE GIVING RESULTS OF ANALYSES.

Location	Na_2CO_3	NaHCO_3	NaCl	Na_2SO_4	Underter- mined.	Total salts.
B1-1'	.000	.117	.012	T	.051	.180
2'	.000	.117	.003	T	.017	.041
3'	.000	.150	.012	T	.069	.231
B2-1'	.031	.133	.015	?	.061	.230
2'	.011	.121	.036	.029	.003	.190
3'	.000	.108	.029	.029	.141	.307
B3-1'	.032	.121	.050	.037	.100	.340
2'	.011	.187	.047	.041	.018	.304
3'	.047	.108	.041	.030	.048	.274
B4-1'	.074	.108	.015	T	.027	.224
2'	.053	.087	.020	T	(-.028)	.132
3'	.058	.083	.027	.028	.061	.297
B5-1'	.042	.117	.023	T	.039	.221
2'	.042	.162	.018	.027	.031	.280
3'	.042	.088	.015	T	.021	.186
B6-1'	T	.183	.015	?	.005	.203
2'	.011	.095	.015	T	.044	.165
3'	.000	.083	.015	T	.015	.113

The percentage of salts in hardly great enough in any of the above samples to interfere seriously with the growth of crops if it were not for the carbonates present.

Carbonates and Bicarbonates in the First and Second Feet.

Location	Salts, percent.	
	Na_2CO_3	NaHCO_3
B1-1	.000	.117
2	.000	.117
B2-1	.031	.133
2	.011	.121
B3-1	.032	.121
2	.011	.187
B4-1	.074	.108
2	.053	.087
B5-1	.042	.117
2	.042	.162
B6-1	T	.183
2	.011	.095
Average	.025	.129

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Soluble Salts in the Soil on Plat Y-16.
(continued).

Assuming that the soil weighs 100 pounds per cubic foot, there is in one acre of land to a depth of two feet 8,712,000 pounds of soil. With an average sodium carbonate content of .025%, and sodium bicarbonate of .129%, there is present 2,178 pounds of the former, and 11,238 pounds of the latter in the upper two feet of one acre of this soil. To neutralize these salts there will be required 1,970 pounds of acid for the carbonates and 6,560 pounds for the bicarbonates, a total of 8,530 pounds acid per acre. The area of Plat Y-16 is practically .3 acre, therefore, 2,560 pounds acid should be added.

Yuma.

During the week ending December 6, the maximum temperature was 74, minimum temperature 24, and greatest daily range 41.

The road on the north side of the farm was leveled. Irrigation boxes for irrigating the road were placed in the Government ditch.

Cotton picking continues on A-2, 5, 15-5, C-25 and D-19. The cotton stubble on A-155, to be volunteered, was covered for the winter. The second cutting of grain sorghum was harvested from A-4. Alfalfa fields C-27, 28, D-27 and E-3 to 6 were harvested.

D-17 was sown to barley and alfalfa. Part of B-25 and 26, orchard, was sown to field peas. The B orchard and dates on A-16 to 21 were cultivated. The alfalfa on B-31, 32, D-6 and 7, was plowed under, and cowpeas as a green manure crop was turned under on A-13₄, 14₂, 15₁, C-21 and 22. The following table gives weights of cowpeas at date of plowing:

Plat No.	Calculated tons per acre green manure.	Equivalent air dried hay, tons per acre.
A-14 ₂	4.56	2.28
A-15 ₁	4.16	2.09
C-21	4.24	2.05
C-22	4.72	1.73

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Yuma (continued).

Depth of Water Table and Salt Content, December 2, 1913.

Well No.	Depth of Water table, ft.	Parts salts per 100,000
1	9.68	74
2	6.53	66
3	7.90	70
4	5.90	91
5	7.02	59
6	3.74	56
7	9.44	69
8	9.13	31
2A	----	55
Tank	----	56
Drainage Canal	----	63

During the week ending December 13 the maximum temperature was 75, minimum 32, and greatest daily range 30.

Cotton picking continues on A-1, 2, 5, C-19, 39 and D-18. Cotton stalks were cut and removed from A-2, 5, and D-19. These three plats will be left to volunteer.

The stalks on grain sorghum plantings A-4, C-37, 38 and D-21 to 26 were cut and are being hauled on sandy places of north road. The arrow weeds on A and B were hauled on the roads.

Field peas from A-12₃ and grain sorghum samples were threshed. Yields from these crops will be reported later.

E-1 and 2 alfalfa plats were harvested. C-29 was sown to alfalfa. The sandy spots on date orchard A-18 to 21 were sown to field peas.

Plats B-9 to 12 and D-8 to 16 recently plowed and irrigated were disked. Leveling was done on B-9 to 12 and on new lands B-13 to 16.

Mr. Blair spent the latter part of the week at Sacaton, Arizona.

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FIELD NOTES.

Belle Fourche.

Rate-of-Seeding Test with Alfalfa.

A rate-of-seeding test with alfalfa was started in 1913 on Field I. The land was fallow in 1912, and was double disked and spring toothed in the spring of 1913. The plats are $1/20$ acres. The seed was planted with a 7-inch drill on June 5, 1913. On August 28, all the plats were clipped; but the plant growth was too light to warrant making determinations of hay yields.

The stands were determined Dec. 10 - 15. The plants in 4 areas, each 3.3 feet square, were counted on each plat, the total area considered on each plat being $1/1000$ acre. The results of the stand determinations are given in the first table. The rate of seeding is given in pounds per acre.

Plat	Rate	No. of plants on $1/1000$ acre areas.				Plants per acre.	
		A	B	C	D		
1	2.5	30	23	23	26	102	102,000
2	3.0	20	16	19	18	73	73,000
3	4.5	25	22	23	27	97	97,000
4	6.0	29	32	24	29	114	114,000
5	8.0	44	29	30	36	139	139,000
6	10.0	36	30	32	37	135	135,000
7	11.5	31	27	27	41	126	126,000
8	13.0	40	38	32	33	143	143,000
9	15.0	33	46	42	35	156	156,000
10	16.5	45	45	36	49	175	175,000
11	18.5	44	54	43	61	202	202,000
12	20.5	56	51	47	56	210	210,000
13	22.5	67	55	55	50	227	227,000
14	25.0	47	52	48	47	194	194,000
Av.		12.6				149	149,000

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FIELD NOTES.

Belle Fourche.

Rate-of-seeding (continued).

No determination was made of the number of seeds per pound of the seed used, but alfalfa seed usually averages about 225,000 seeds per pound. If it is assumed that the seed used was of average size and weight, the second table shows the percentages of seed which produced plants according to the counts made in December.

Plat	Rate	Seeds per acre, (,000 omitted)	Plants per acre, (,000 omitted)	Percent of seeds producing plants.
1	2.5	562	102	18
2	3.0	675	73	11
3	4.5	1012	97	10
4	6.0	1350	114	8
5	8.0	1800	139	8
6	10.0	2250	135	6
7	11.5	2587	126	5
8	13.0	2925	143	5
9	15.0	3375	156	5
10	16.5	3712	175	5
11	18.5	4162	202	5
12	20.5	4612	210	5
13	22.5	5062	227	4
14	25.0	5625	194	3
Average	12.6	2836	149	7

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FIELD NOTES.

Truckee-Carson.

During the week ending December 27 the maximum temperature was 45, minimum temperature 16.

Owing to the continuous bad weather little field work was accomplished. The day men were dismissed until the return of good weather, and the regular employees were given the annual leave due them.

Mimeographed circulars outlining the experiments on the "Y" series were sent to the local farmers. This is the third circular of this character distributed during the year.

Yuma.

During the week ending December 20 the maximum temperature was 73, minimum temperature 34, and greatest daily range 37.

The work of leveling B-13 to 17 continues.

Cotton picking continues on C-19, 23, 24, 26, D-39 and D-45. Cotton stalks were cut on A-1, C-23 and D-18.

A priming coat of paint was given the bunk house. The office roof, which was leaking badly, has been repaired.

During the week ending December 27, the maximum temperature was 71, minimum temperature 34, and greatest daily range 33.

Alfalfa was harvested from Fields C-42 to 45. Cotton on C-26 was picked and stalks on C-23 were cut.

C-39, 40 and 41 were plowed, and the stalks on C-24 and D-18 were removed. Leveling on the "B" series continues.

The office floors and farm machinery are being painted. Part of the grounds were seeded to rye grass.

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FIELD NOTES.

Yuma (continued).

Water Table Determination.

Well No.	Depth of Water Table, feet.		
	Dec. 29	Dec. 2	Fall
1	9.7'	9.68'	+0.02
2	6.6'	6.53'	+0.07
3	7.4'	7.90'	-0.50
4	5.7'	5.90'	-0.20
5	6.8'	7.02'	-0.22
6	3.8'	3.74'	+0.06
7	9.5'	9.44'	+0.06
8	9.2'	9.13'	+0.07

Local Distribution of Circular Letters.

Mr. Headley reports that much interest is manifested in the circular letters distributed among the farmers of the Truckee-Carson Project. These letters deal informally with agricultural subjects of special local interest, and, incidentally, describe and discuss the work being carried on at the Truckee-Carson Experiment Farm, with a view to solving local problems. The material is sent to the Washington office for approval before the letters are mimeographed.

Three circular letters were distributed from the Truckee-Carson Experiment Farm in 1913. The first, which was distributed in May, contained eight pages, and discussed the problems pertaining to the alkali soils of the Project. The second, which contained three pages, discussed "Blight of Apples and Pears", and was distributed in July. The third, which was distributed in December, contained three pages, and described the experiments recently inaugurated on Field "Y", for the purpose of finding practical methods of increasing the porosity of the surface soil, and reducing the total salt content of the soil.

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Stock Feeding on the North Platte Project.

Mr. Knorr has submitted the following report of a visit he made in December to a number of sheep and cattle feeders on the North Platte Project.

"It is estimated by the banks here that approximately 250,000 sheep and 20,000 head of cattle are being fed on the Project. It is likely that the actual numbers are greater than these, since the above estimate is based upon the transactions financed by the banks, and there are always a number of large ranchmen who bring their own cattle into the valley for winter feeding.

"At the sugar factory at Scottsbluff 3500 head of cattle and 35,000 sheep are being fed. These stock are being fed at the factory in order to avoid the necessity of shipping beet pulp and syrup. Both cattle and sheep receive both of these feeds. The cattle receive daily per head about 133 pounds of pulp, 5 pounds of syrup, and all of the alfalfa hay they will eat. About 30 to 40 days before marketing, the ration is changed so as to include pulp, alfalfa hay, 4 pounds of corn, $1\frac{1}{2}$ pounds of oil meal, and 4 pounds of syrup. The pulp is fed in bunks. The syrup is heated and added to the pulp before the latter is placed into the feed car. As a rule the large feeders feed definite rations and they know fairly well the amount of feed consumed and the gains made. The smaller feeders whom we visited are feeding chiefly alfalfa hay alone, and had little or no knowledge of the quantities consumed or the gains made. Many of them practised very wasteful methods of feeding. One farmer who feeds pulp hauls it 5 miles, throws it into ~~beans~~ on the fields and then pours syrup on to it. This man had only a vague idea as to the quantity of syrup he was using. We estimated that he was feeding about 80 pounds of pulp and 3 pounds of syrup per head per day. The majority of the small feeders expect to market their stock without feeding any grain or other feed except alfalfa. Except at the feed yards at the sugar factory, most of the methods followed are extremely wasteful.

"A number of the poorer farmers who cannot afford to buy the stock, or who have no credit at the banks, are feeding cattle for shippers at the rate of 5 cents per pound of increase in weight. This is doubtless a losing proposition to the farmer. It is probable that at this rate the

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Stock Feeding on the North Plate Project (continued).

farmers will not receive more than \$2 a ton for their alfalfa, and for the labor of feeding it, but they feel that even this is better than letting the hay stand in the field.

"The major portion of the cattle being fed are "common feeders", but they are probably about 4000 head of "inferior feeders and cows", and about 10 carloads of bulls. Much of the inferior stuff is being fed by the poorer farmers on the 5 cent basis. Some of the best results which have been obtained with the thin stuff have been secured from feeding beet tops. Some farmers state that where the cattle are allowed to run to hay stacks as well as to the beet fields they seldom leave the beet tops for the hay.

"It appears that better returns will be received from feeding sheep and lambs than from feeding cattle this year. One man recently shipped 492 head of lambs for which he received \$5.75 per head. These lambs were picked from a band of 1550 head purchased six weeks ago at Billings, the price paid being \$4.50 per hundred weight, less the freight to Omaha. When the lambs were unloaded at Scottsbluff they averaged 77 pounds, or $\frac{1}{2}$ pound less than at Billings. The 1550 head were left on 100 acres of beet tops for $5\frac{1}{2}$ weeks, during which time they consumed, in addition to the beet tops, about 30 tons of alfalfa hay. At the time the 492 head were shipped they averaged 89 pounds. Another man had just received his pay for 3 cars of ewes. The ewes cost him \$2.75 at Minatare. After they had been on beet tops for about 6 weeks and received corn for one week they were sold at Omaha for \$3.99. With the sheep feeders we found the same uncertainty with respect to quantities of feed consumed and gains made as we found among the cattle feeders. A few of the more experienced men knew definitely what they were doing, but the majority of the feeders were working rather blindly. Except at the sugar factory we found no instances where syrup was being fed to sheep. This practice has been so little tried locally that very few of the feeders wish to follow it."

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Technical Books on Field Stations.

In the Weekly Bulletin of June 31, and in one or two subsequently issued bulletins, the field men were requested to send in lists of technical books in their libraries, and to furnish with the list a brief statement of the value of each book. Some responses to these requests have given full information while others have merely listed the books without making any comments.

Using the comments made as the basis for classification, the books listed fall into three general classes. The first class includes those books which are rather highly recommended, and which have been found really useful. The second includes those upon which the reports do not agree, or upon which no comments are made; and the third class includes those which have received adverse criticisms.

Following this classification there is given below a list of about 120 books.

Animal Husbandry.

<u>Author.</u>	<u>Title.</u>
Henry Grotenfelt	Feeds and Feeding. Principles of Modern Dairy Practice.
Dietrich	Swine.
Purvis	Poultry Breeding.
Davenport	Principles of Breeding.
Roberts	The Horse.
Eccles	Dairy Cattle and Milk Pro- duction.
Woll	Handbook for Farmers and Dairymen.
U.S.D.A.	Diseases of the Horse.
U.S.D.A.	Diseases of Cattle.

Two additional animal husbandry books which are not so well recommended, but which may merit consideration, are the following:

<u>Author.</u>	<u>Title.</u>
Brigham Wing	Progressive Poultry Culture. Sheep Farming in America.

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Technical Books (continued).

Botany.

<u>Author.</u>	<u>Title.</u>
Coulter, et al	New Manual of Botany of the Central Rocky Mountains.
Jackson	Glossary of Botanical Terms.
Sargent	Manual of North American Trees.
Small	Flora of the Southwestern United States.
Britton	Manual of the Flora of the Northern States and Canada.
Robinson & Fernald	Gray's New Manual of Botany.
Sorauer	Plant Physiology.

Chemistry and Bacteriology.

Mason	Examination of Water.
Remsen	Textbook of College Chemistry
Sutton	Volumetric Analysis.
Richter	Inorganic Chemistry.
Richter	Organic Chemistry.
Conn	Agricultural Bacteriology.
Lipman	Bacteria in relation to Country Life.

The following were mentioned but not specially recommended:

Shrimpf	Textbook of Volumetric Analysis.
Mendeleif	Principles of Chemistry.
Fresenius	Quantitative Chemical Analysis.

One book on the subject of Chemistry was characterized as "not good". This book is -- "Wells - A Laboratory Guide to Qualitative Chemical Analyses."

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Technical Books (continued).

Crops.

<u>Author.</u>	<u>Title.</u>
Hunt	Forage and Fiber Crops in America.
Hunt	Cereals in America.
Duggar	Southern Field Crops.
Coburn	The Book of Alfalfa.
Voorhees	Forage Crops.
Fraser	The Potato.
Johnson	How Crops Grow.
Johnson	How Crops Feed.

The following were mentioned, but no specially recommended:

Burkett & Poe	Cotton--its Cultivation, Marketing and Uses.
Spillman	Farm Grasses of the United States.
Wing	Alfalfa in America.
Bowman & Crossley	The Sweet Potato.
	Corn.

Farm Engineering.

Davidson & Chase	Farm Machinery and Farm Motors.
Merriman	American Civil Engineer's Pocket Book.
Ellis & Rumley	Power and the Plow.
King	Physics of Agriculture.

One book called "Handy Farm Devices and How to Make Them" was recommended by some and adversely criticized by others. Another book, "Farm Buildings", was mentioned by several, but not commented upon.

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Technical Books (continued).

Horticulture.

<u>Author.</u>	<u>Title.</u>
Wickson	California Fruits.
Bailey	Cyclopedia of American Horticulture.
Bailey	Evolution of our Native Fruits.
Munson	Foundations of American Grape Culture.
Taft	Greenhouse Management.
Bailey	Horticulturist's Rule Book.
Bailey	Pruning Book.
Bailey	The Nursery Book.
Bailey	Garden Making.
Green	Vegetable Gardening.
Wickson	California Vegetables.
Budd & Hansen	American Horticultural Manual.
Thomas	The American Fruit Culturist.
-----	Bulbs and Tuberous-Rooted Plants.
Card	Bush Fruits.
Beattie	Celery Culture.
Hume	Citrous Fruits and their Culture.
-----	The Forcing Book.
Greiner	The New Onion Culture.
-----	Propagation of Plants.
Morse & Fiske	The New Rhubarb Culture.
Paddock & Whipple	Fruit Growing in Arid Regions.

The following were named but not highly recommended:

Bailey	Principles of Vegetable Growing.
Bailey	Plant Breeding.
Bailey	Principles of Fruit Growing.
Waugh	Landscape Gardening.
Waugh	The American Apple Orchard.
Hexamer	Asparagus.

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Technical Books. (continued)

Horticulture (continued)

<u>Author.</u>	<u>Title.</u>
Seavey	Bean Culture.
Fernon	The Care of Trees.
Bingle	Vegetables.
Maynard	Successful Fruit Culturist.
Fletcher	How to Make a Fruit Garden.
-----	Plums and Plum Culture.
Waugh	Systematic Pomology.
-----	Tomato Culture.
Green	Amateur Fruit Growing.

The following were listed and condemned on account of being inadequate, out-of-date, too general, or for some other reason:

Barry	The Fruit Garden.
Bingle	The Berry Book.
-----	Fruit Harvesting, Storing and Marketing.
-----	The Crop Culturist.
-----	The Nut Culturist.

Insects and Diseases.

Smith	Economic Entomology.
Folsom	Entomology, with special reference to Biological and Economic Aspects.
Sanderson	Insects Injurious to Staple Crops.
Comstock	Manual for the Study of Insects.
Lodeman	The Spraying of Plants.
Massee	Textbook of Plant Diseases.
Chittenden	Insects Injurious to Vegetables.
Sanders	Insects Injurious to Fruits.
Duggar	Fungous Diseases of Plants.



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Technical Books (continued).

Irrigation and Drainage.

<u>Author.</u>	<u>Title.</u>
King	Irrigation and Drainage
-----	Irrigation Engineering.
Newell	Irrigation.

The following have been mentioned but not generally recommended as being useful:

Mead	Irrigation Institutions.
Wilcox	Irrigation Farming.
Olin	American Irrigation Farming.

Soils and Fertilizers.

Hilgard	Soils.
Snyder	Soils and Fertilizers.
Voorhees	Fertilizers.
Roberts	The Fertility of the Land.
King	The Soil.

Hopkins' "Soil Fertility and Permanent Agriculture" was not mentioned, but the book contains some useful information.

General Agriculture and Miscellaneous.

Bailey	Cyclopedia of American Agriculture.
King	Farmers of Forty Centuries.
Hall	The Book of the Rothan-stead Experiments.
Coulter	Cooperation among Farmers.
Carver	The Principles of Rural Economics.
Davenport	Principles of Breeding.
Storer	Agriculture.
Davenport, C. B.	Statistical Methods.

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Technical Books (continued).

General Agriculture and Miscellaneous (continued)

Additional books which have been named, but not specially recommended, are:

<u>Author.</u>	<u>Title.</u>
Bailey	Principles of Agriculture.
Brooks	Agriculture.

PERSONAL.

Mr. R. W. Allen reported for duty at the Washington office December 30, but soon after arrival symptoms of smallpox developed, and he and Mrs. Allen have been isolated. Latest reports indicate that Mr. Allen is doing well, and will be ready to resume his work by the 15th of the month. So far, Mrs. Allen has not contracted the disease.

FIELD NOTES.

San Antonio.

During the week ending January 4, the maximum temperature was 67, minimum temperature 27, and greatest daily range 38. Light frosts occurred every day during the week.

Field work was begun after the long continued lay-off owing to wet weather. All the fallow land was harrowed and plowing of C4 was completed.

The second cutting of sorghum from the rotation plats was drawn in and weighed. The yields from this cutting, as well as the first, and the total yield per

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FIELD NOTES.

San Antonio (continued).

plat and rate of yield per acre is given in the following table:

Y I E L D .						
Plat No.	Date	1st. cutting	2nd. cutting	Yield, pounds	Total pounds per plat	Tons per acre
		Date	Yield, pounds			
<u>8-inch drills</u>						
A4-13	7/15	2270	10/28	721	2991	11,964
A4-17	7/15	2122	10/28	715	2837	11,348
B4-13	7/15	2118	10/28	1341	3459	13,836
B5-6	7/15	1408	10/28	593	2001	8,004
B5-12	7/15	2214	10/28	1445	3659	14,636
B5-16	7/15	2070	10/28	1607	3677	14,708
Average		2034		1070.3	3104	12,416
						6.21
<u>4.1 ft. drills</u>						
A4-9	7/25	1822	10/28	1021	2843	11,372
A6-4	7/14	1890	10/28	359	2249	8,996
B5-5	7/14	2350	10/28	1011	3361	13,444
B5-10	7/14	2435	10/28	1241	3676	14,704
B5-14	7/14	2512	10/28	1378	3890	15,560
Average		2201.8		1002	3203.8	12,815.2
						6.41

The sorghum was in very poor condition and was not thoroughly dry, but the condition of the hay from each plat was about the same so that the yields are comparable although somewhat higher than they should be.

Pruning of the orchard on A1 was completed.

17 January, 1914.

FIELD NOTES.

Belle Fourche.

The results of the corn variety test conducted in 1913 in cooperation with the Office of Corn Investigations are reported below. The test was conducted on the south side of the garden tract. The corn was planted May 28, in checks 3' 8" x 3' 6". The rows were 110 feet long. After the plants were up, they were thinned to 3 stalks to the hill. The corn was cultivated four times and furrowed twice. Four irrigations were applied, on July 14 and 25, August 5, and September 1.

The varieties were planted in plats 2 rows wide and 110 feet long, and duplicated. The figures given below are averages of the duplicates. The stalks per row and suckers per stalk were determined by actual counts on all the plants in the entire series. The yields were calculated to a 12 percent moisture basis for each variety.

Variety	Stalks per row	Suckers per stalk	Date of maturity	Moisture content, %	Yield per acre, bus.
Martens White Dent	92	0.4	Sept. 11	30.2	60.4
Northwestern Dent	87	1.6	Sept. 4	25.8	56.2
U.S.Selection 133	92	0.3	Sept. 13	31.8	56.2
Paynes White Dent	92	0.8	Sept. 11	30.0	55.3
Disco Dent	87	0.7	Sept. 15	29.0	54.3
Brown County Yellow	91	0.7	Sept. 6	30.4	51.2
Ardmore Yellow Dent	81	0.6	Sept. 6	30.3	49.2
Disco Flint	91	1.7	Sept. 13	30.0	45.5
Minn. #23	<u>86</u>	<u>0.5</u>	Sept. 6	<u>25.2</u>	<u>38.6</u>
Average	89	0.8		29.2	51.8

It is of interest that these same nine varieties were total failures as regards grain yield in 1913 on the dry portion of the farm.

17 January, 1914.

FIELD NOTES.

Truckee-Carson.

Experiment to Determine Effect of Various Amounts
of Sodium Carbonate in the Soil upon the Germination
of Wheat Seeds and upon the Growth of the Seedlings.

Three hundred grams of soil were weighed in to each of 36 common drinking glasses on October 28, 1913. Solutions of sodium carbonate were made up and added to the glasses so as to bring the sodium carbonate content of the soil (theoretically) up to the percentages shown in the following table. Water was added to each glass to bring the moisture content of the soil to 15%. This percent of water was approximately maintained by bringing the glasses back to weight each day by the addition of distilled water. The experiment was conducted in triplicate. Five wheat seeds were added to each glass.

The soil used in the experiment was analyzed and found to contain salts as follows:

Sodium carbonate .....	.000%
" bicarbonate.....	.095%
" chloride.....	.000%
" sulphate.....	.000%
Undetermined.....	.010%
Total salts.....	<u>.105%</u>

Table showing amount of Na_2CO_3 .

Glass No.	c.c. 10% solution Na_2CO_3 added.	Theoretical % Na_2CO_3 in soil	Theoretical % Na_2CO_3 in soil solution.
1	.00	.00	.00
2	1.5	.05	.30
3	3.0	.10	.60
4	4.5	.15	.90
5	6.0	.20	1.20
6	7.5	.25	1.50
7	9.0	.30	1.80
8	10.5	.35	2.10
9	12.0	.40	2.40
10	13.5	.45	2.70
11	15.0	.50	3.00
12	18.0	.60	3.60

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FIELD NOTES.

Truckee-Carson.

Effect of sodium carbonate on germination of wheat (continued).

Table Showing Growth of Wheat in Each Glass.

Glass No.	Series I			Series II			Series III			
	No. plants	Av. height	Total wt.	No. plants	Av. height	Total wt.	No. plants	Av. height	Total wt.	Av. wt.
1	5	19.20	.973	5	18.10	1.009	5	18.56	.937	.187
2	5	18.16	.978	5	17.58	.950	5	19.30	.974	.195
3	5	15.41	.697	5	17.38	.865	5	17.06	.847	.169
4	5	11.90	.619	3	4.43	.061	5	5.00	.116	.023
5	2	9.45	.220	4	3.75	.055	4	2.65	.044	.011
6	2	2.40	.008	1	2.50	.012	2	2.85	.020	.010
7	0	0	0	1	2.70	.008	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0

Table Summarizing Results from Growth of Wheat Seedlings.

Glass No.	No. plants	Av. ht. cm.	Total wt., grams	Av. wt. per plant, grams
1	15	18.62	2.919	.195
2	15	18.35	2.902	.194
3	15	16.62	2.409	.160
4	13	7.11	.796	.056
5	9	5.25	.319	.054
6	5	2.58	.040	.009
7	1	2.70	.008	.008
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0



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FIELD NOTES.

Truckee-Carson.

Effect of sodium carbonate on germination of wheat (continued).

Table summarizing the results of the analyses of soil in glasses, Nos. 1 to 6, in each of the three series after the completion of the experiment.

Averages of Three Series.

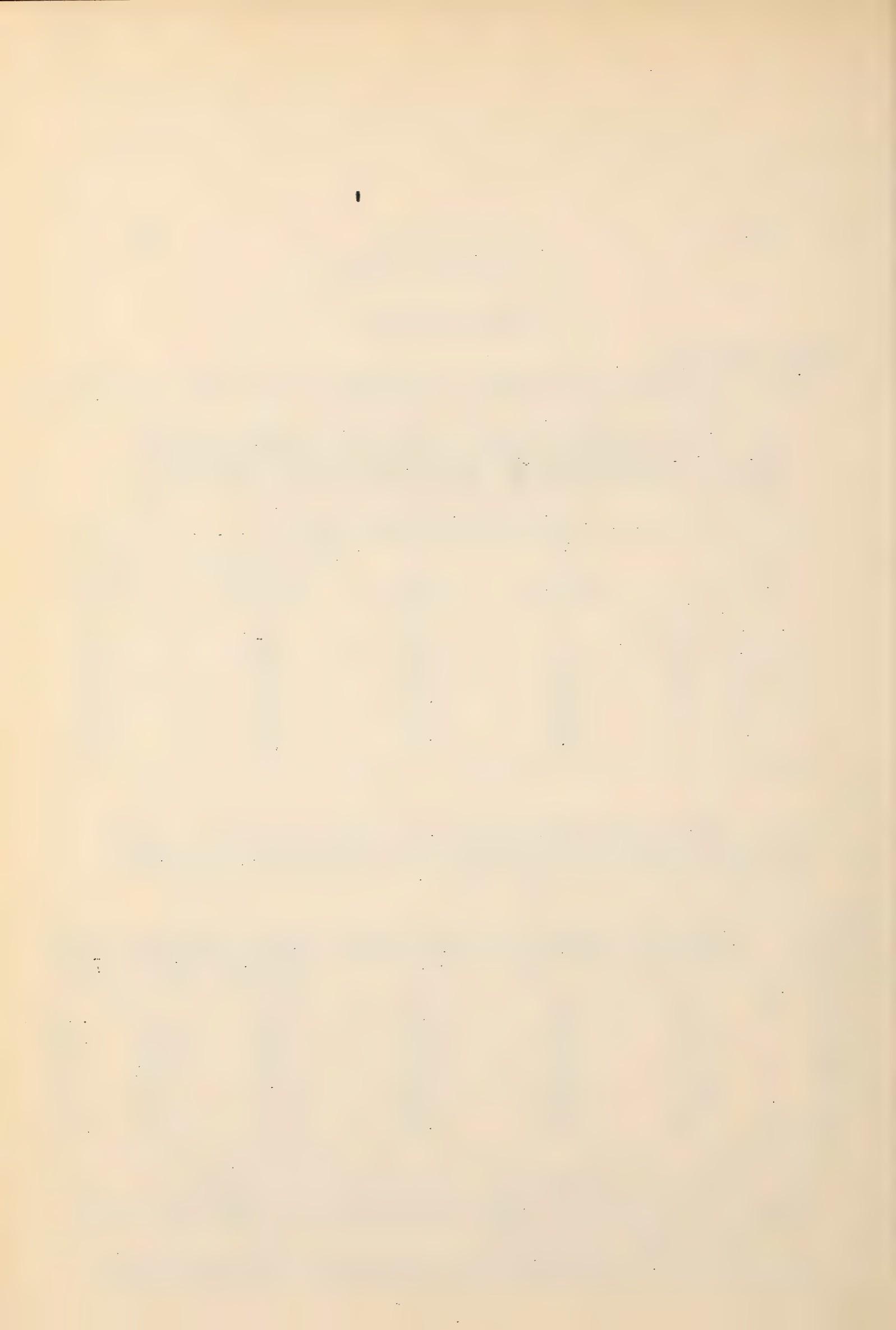
Glass No.	% Na ₂ CO ₃	% NaHCO ₃	Undetermined Salts.	Total Salts.
1, 1a & 1b	0	.060	.017	.077
2, 2a & 2b	0	.080	.009	.089
3, 3a & 3b	.002	.095	.010	.107
4, 4a & 4b	.017	.097	.012	.126
5, 5a & 5b	.030	.114	.021	.164
6, 6a & 6b	.068	.112	.033	.213

Table comparing theoretical salt content of soil at beginning of experiment with salts actually found at the end of the experiment.

Glass No.	Theoretical content at beginning			Actual content at end		
	% Na ₂ CO ₃	% NaHCO ₃	Total	% Na ₂ CO ₃	% NaHCO ₃	Total
1	.000	.095	.105	.000	.060	.077
2	.050	.095	.155	.000	.080	.089
3	.100	.095	.205	.002	.095	.107
4	.150	.095	.255	.017	.097	.126
5	.200	.095	.305	.030	.114	.164
6	.250	.095	.355	.068	.112	.213

There is apparently a disappearance of soluble salts in all glasses, including those to which no sodium carbonate had been added.

A portion of the sodium carbonate added, appears to have been transformed to bicarbonate in some cases.



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FIELD NOTES.

Truckee-Carson.

Effect of sodium carbonate on germination of wheat (continued)

Table showing effect of alkali salts on the growth of wheat seedlings as determined by weight.

Glass No.	Theoretical salt con- tent by addition of Na_2CO_3	Total wt. wheat seedlings.	Actual salt content determined by analyses	
	% Na_2CO_3	%Total salts	% Na_2CO_3	%Total salts
1	.000	.105	.000	.077
2	.050	.155	.000	.089
3	.100	.205	.002	.107
4	.150	.255	.017	.136
5	.200	.305	.030	.164
6	.250	.355	.068	.213
7	.300	.395	.105	.247
8	.350	.445	.000	

The effect of the "actual salt content" on the growth of the wheat seedlings, agrees very closely with results obtained when the soil samples are secured directly from the field.

Many soil samples have been analyzed from the Experiment Farm, and private farms, on the project, and the results have led to the conclusion that good crops of grain or alfalfa do not grow in soils containing as much as .05% sodium carbonate.

With these results in mind, the wheat seedlings could not be expected to grow well in the soil of No. 2, and scarcely at all in No. 3 if all the sodium carbonate added at the beginning of the experiment was actually effective.

The carbonate limit cannot be determined from this experiment on account of the large amount of bicarbonates present.



17 January, 1914.

A METHOD OF ESTIMATING CORN YIELDS.

In connection with the corn hogging work being done in the rotation experiments at Scottsbluff, Huntley and Belle Fourche, it is desirable to have some reliable method of estimating the yields of corn on the hogged plats in order that dependable figures may be secured on the efficiency of the corn when hogged. The following is a method suggested by Mr. G. N. Collins of this Bureau.

1.-- The stand is determined by actual count of all the stalks on the plat.

2.-- The ears are harvested from 100 stalks which are selected systematically on the basis of 100; that is, if a plat contains approximately 1200 stalks the ears from every twelfth stalk are harvested; if it contains nearer 1300 stalks, then the ears from every thirteenth stalk are harvested, and so on.

3.-- The weight is then determined of the product of these stalks taken systematically by tens; that is, the product of the first ten stalks harvested is weighed by itself; then that of the second 10 stalks, and so on. The average weight of the yields of the 10-stalk units is divided by 10 to obtain the average yield per stalk. The yield per acre is then obtained by multiplying the yield per stalk by the number of stalks. The product is weighed by 10-stalk units rather than all together in order to furnish a means of measuring the accuracy of the method.

In connection with the use of the above method, the following suggestions are made:

1. There must be a definite standard of what is to be considered a stalk, and when the standard is adopted it must be rigidly adhered to in counting the stalks and in harvesting. It is probable that to count all stalks which bear tassels will be found satisfactory. If this standard is adopted and used in determining the number of stalks per plat, then all tassel bearing stalks must be considered in harvesting the hundred stalks. If the tenth stalk, for example, bears no ears, its yield must be considered nevertheless and recorded as zero. That is, if 1 or 2 or 3 of 10 stalks which are systematically selected are non-productive, the total yield of the group must nevertheless be divided by 10 to obtain the yield per stalk.

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A Method of Estimating Corn Yields (continued).

3.-- It is not necessary to use 100 plants at all times; but it seems that this number will be satisfactory on quarter-acre plats. The number of stalks per quarter-acre plat runs from 1500 to 3500, the average being probably about 2500. With such a stand, if the 100 stalk basis is used, it would be necessary to harvest every twenty-fifth stalk, or $1/25$ of the total number. The average yield per quarter-acre plat is seldom higher than 15 bushels. In harvesting 100 stalks, therefore, it will seldom be necessary to handle more than $3/5$ of a bushel.

3.-- This harvested corn should be dried before the final weights are made. It is desirable to have both green and dry weights. Both these weights should be determined as indicated under (3) above.

4.-- The small quantity of corn harvested should be returned to the plat before the hogs are taken off.

5.-- The method should be tried on one or more of the regularly harvested corn plats, so that some idea can be gained as to the reliability of the method.

F.D.F.

First, Second and Third Crop Alfalfa Hay.

Bulletin 126, of the Utah Experiment Station, reports the results of an experiment to determine the relative values of first, second and third crop alfalfa hay for milk production. Three lots of 5 cows each were fed for approximately twelve weeks in 1911 - 12, and again in 1912 - 13, each lot being fed on hay from each of the three crops for about four weeks each year.

The following are some of the points brought out in the bulletin:

1. The cows ate more of the third crop than of the first and second, and more of the first than of the second; the differences were small.

2. The most butter fat was produced from first crop hay, the next highest from second crop, and the

17 January, 1914.

First, Second and Third Crop Alfalfa Hay (continued).

least from third crop; the differences again were small.

3. When the quantity of feed consumed is considered, it is seen that the highest efficiency was shown by second crop hay; for each 100 feed units consumed, butter fat was produced as follows: first crop, 5.00 pounds; second crop, 5.36 pounds, and third crop, 4.78 pounds.

A number of other interesting results are brought out, and all the work is set forth in much detail. The author states that this is the first investigation of its kind. The bulletin contains some valuable information for those who are interested in problems of feeding and of alfalfa hay disposal.

F.D.F.

Sweet Clover for Hog Pasture.

"Hoard's Dairyman" for November 21, 1913, contains the following report of an experiment in which sweet clover was compared with red clover as pasture for hogs:

"At the Iowa Experiment Station a grazing experiment with young shoats was made, followed with these results:

	Sweet Clover	Red Clover
No. of pigs per acre.....	18	15
Daily gain per head, pounds.....	1.02	1.13
Gain for entire lot per acre, pounds.....	2594	2394
Grain required for 100 pounds of gain in addition to pastur- age, pounds.....	338	333

From the foregoing experiment it will be seen that sweet clover has a high feeding value with the further advantage that it can be grown on fields where red clover is hard to catch or make a satisfactory growth."

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FOUNTAIN PENS.
Loss of, to be reported immediately.

Memorandum for Heads of Offices, dated January 13, 1914, reads as follows:

"It has been brought to my attention that quite a number of fountain pens belonging to the Bureau have been lost by employees during the past few years. I shall be obliged if you will call this matter to the attention of employees serving under your direction and notify them that in future they will be required to replace lost articles of this nature, unless the loss articles be at once reported, through the Chief Clerk of the Bureau, by letter wherein it is clearly shown that the loss did not occur through any negligence on the part of the person accountable. It is believed necessary to take some such step to reduce the number of lost articles to a minimum.

Very truly yours,
(Signed) Wm. A. Taylor,
Chief of Bureau."

ERRATA.

On Page 20, of the Weekly Bulletin, of January 10, 1914, the following corrections should be noted:

The number of total pounds per acre on Plat A4-9 (4.1 ft. drills) should be 14,215 instead of 11,373, a difference of 2,843 pounds, which changes the number of tons per acre for this plat from 5.69 to 7.11. The average total pounds per acre and tons per acre should be accordingly corrected to read respectively 13,384 and 6.69.

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FIELD NOTES.

Huntley.

Sugar Beets on the Huntley Project
and Other Parts of the Billings
District, 1913.

The following date on sugar beets raised on the Huntley Project during 1913 is taken from information furnished by the manager of the Billings Sugar Company.

A total of 4,500 acres of beets were grown for delivery at the Huntley Project receiving station. The average yield from this area was 9.2 tons per acre. As a part of the beets delivered at the Huntley Station were grown on land not included in the Project this yield is not a fair average. Eliminating the Huntley Station would leave 3,673 acres for the remainder of the Project, which yielded an average of 9.8 tons per acre. The exact acreage of beets on the Project is not given, but it is thought that this yield would be a fair average of the entire Project. The total acreage for the entire territory delivering beets to the Billings factory was 23,188 acres which produced an average of 10.07 tons per acre.

The average sugar content of beets for the whole area was about 16.5% and from the Huntley Project, 17%. The average price received for beets on the whole area was \$5.80 per ton, not including the amount paid for siloed beets, while from the Project the price received was \$6.00 per ton.

As an instance of the value of alfalfa land for sugar beet growing, the following case is cited. On the farm of Mr. Smith, near Osborn, in 1913, five acres of beets on alfalfa ground, broken up in the fall of 1912, yielded at the rate of 19.5 tons per acre. The beets tested 16.5% sugar, making the price received \$5.75 per ton. The gross income would then be \$112.12 per acre. On an adjoining 14.5 acres that had been cropped to beets two years and grain three years, the average yield was 10 tons per acre. The beets tested 17% sugar. The price received was \$6.00 per ton, and the gross income \$60.00 per acre.

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FIELD NOTES.

Truckee-Carson.

During the week ending January 10, the maximum temperature was 51, minimum temperature 17, and precipitation .09 inch.

Work on the drainage system was discontinued until later in the year when the ditch bottoms do not freeze so hard. A crew of six men will then be employed to push the work.

The leveling of Fields "Y" and "C" was continued.

Work on the construction of irrigation boxes and gates was begun. Redwood lumber for this purpose was purchased from the Reclamation Service.

PERFORMANCE OF TOMATO VARIETIES, 1913.

Variety	Entry Number	Number Plants	Date First Ripe	Pounds per Yield	Yield per Plant
Stone	2098	44	Aug. 14	391	8.9
Globe	2151	39	" 28	304	7.8
Select Stone	2148	43	" 28	300	7.0
Early Wonder	2094	38	" 25	249	6.5
Trophy	2196	49	" 31	293	6.0
Coreless	2152	45	Sept. 4	228	5.1
Royal Red	2173	49	Aug. 26	244	5.0
Early Hustler	2153	50	" 4	241	4.8
Dwarf Champion	2147	44	" 15	204	4.6

The best yielding varieties were the Stone and Globe. The poorest yielding variety was the Dwarf Champion, which in previous years had always been one of the best.

Early Hustler was the earliest variety, but it is undesirable for two reasons: (a) The vines are weak and lie flat on the ground; (b) The vines are comparatively leafless and the fruits are thus exposed to the direct rays of the sun, resulting in damaged fruit.

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FIELD NOTES.

Truckee-Carson (continued).

RESULTS OF VARIETY TEST OF STRING BEANS, 1913.

Variety	Entry Number	Date First Picking	Date Last Picking	Total Yield, Pounds	Yield per 100 ft. row.
Dwarf Stringless White					
Wax.....	1724	Jul. 24	Sept. 22	126	36.5
Refugee.....	2172	Aug. 23	" 22	116	33.6
Dwarf Horticultural....	1759	" 4	" 20	82	23.8
Davis White Wax.....	1763	Jul. 23	" 18	78	22.6
Black Valentine Dwarf...	2171	Aug. 4	" 22	70	20.3
Red Valentine.....	2105	" 4	" 20	58	16.8
Early Long Yellow Six Weeks					
Weeks.....	1720	" 2	" 22	35	10.1
Improved Golden Wax.....	1755	Jul. 28	" 4	32	9.3
White Dutch Case Knife..	1722	?	" 20	28	8.1
Large White Marrow.....	1754	Aug. 11	" 20	20	5.8

RESULTS OF VARIETY TEST WITH SHELL BEANS, 1913.

Variety	Entry Number	Pounds, Total Yield	Yield per 100 feet.
Colorado Mexican.....	1757	20.5	5.9
Horticultural Pole....	1760	10.75	3.1
Southern Prolific....	2170	10.	2.9
Navy.....	1756	8.5	2.5
Mexican Pinto	1758	7	2.0

Note. The length of the rows from which the results given above were obtained was 345 feet.

24 January, 1914.

FIELD NOTES.

Truckee-Carson (continued).

METEOROLOGICAL REPORT, 1913.

MONTH	Temperature			Precipitation			Evapor- ation (inches)	Wind Velocity
	Max.	Min.	Mean	Total inches	Greatest in 24 hours	Total Date		
Jan.	64	10	28.2	.25	.11	15	8.57	4.17
Feb.	61	3	32.6	.21	.18	31	1.71	3.21
Mar.	79	10	40.7	.26	.21	11	3.71	4.66
Apr.	81	17	49.2	.25	.19	18	6.79	5.99
May	91	21	58.5	2.15	1.69	28	8.03	4.45
Jun.	88	39	63.4	.99	.29	9&26	7.86	3.59
Jul.	99	42	70.0	1.52	.83	23	9.05	3.42
Aug.	96	42	71.85	.94	.42	29	7.97	2.29
Sept.	95	27	64.5	.03	.03	13	7.10	2.54
Oct.	81	21	50.4	.04	.04	8	4.01	2.48
Nov.	73	15	42.1	1.14	.6	13	1.6	2.64
Dec.	62	13	30.35	.30	.13	20	.54	2.77
<hr/>								
For the year : 99.0 : 3.0 : 50.15 : 8.08 : 1.69: 5/28 : 60.94 : 3.51								

Date of last killing frost in Spring..... May 13.

First killing frost in Fall..... Sept. 23.

Frost free period, 133 days.
 Clear 186 days.
 Partly cloudy..... 91 days.
 Cloudy..... 88 days.

BOARD OF SURVEY.

There has been called to the attention of this office a case where the report of a board of survey was sent direct to the Officer in Charge of Accounts. It is desirable that this office have a memorandum of sales effected by boards of survey and it is also

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Boards of Survey (continued).

necessary to forward all such reports through the Bureau Office of Records. It is therefore requested that these reports be sent to this office for transmittal through proper channel to the Division of Accounts. It should also be noted that these reports should be made in duplicate, in order that one copy may be returned to the board as its receipt.

RECLAMATION RECORD.

To be sent to Field Stations.

Through the courtesy of the Director, upon request from this office, the names of the field stations operated by this office have been placed upon the mailing list to receive the Reclamation Record. The Record is published and sent out monthly by the Reclamation Service.

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FIELD NOTES.

Truckee-Carson.

During the week ending January 17, the maximum temperature was 55, minimum temperature 13, and precipitation .38 inch.

The hedges and trees in "A" were pruned. Several dozen irrigation gates and boxes were constructed of redwood to replace the old decayed structures in the fields. One man and team were kept busy hauling manure to the orchard.

Through the year samples were taken weekly of the water pumped from the drainage system and analyzed. In the report for the week ending May 17, 1913, it was shown that 1,195 cubic feet of water are pumped for each kilowatt of electricity used. From this data calculations of the amount of water and salts pumped out for each month of the year 1913 have been made.

Table showing the amount of electricity used, amount of water, and total salts pumped from the drainage system for each month of the year 1913.

Month	: Kilo-	Water pumped		: Av. %	Lbs. salts	
	watts	Cu. ft.	Pounds		Salts	Pumped
Jan.	: 18	: 21510	: 1343000	: .250	: 3360	
Feb.	: 26	: 31090	: 1940000	: .239	: 4640	
Mar.	: 60	: 71750	: 4480000	: .232	: 10390	
Apr.	: 100	: 119400	: 7460000	: .285	: 21250	
May	: 125	: 149500	: 9350000	: .323	: 30200	
June	: 66	: 78950	: 4930000	: .296	: 14600	
July	: 38	: 45450	: 2840000	: .247	: 7020	
Aug.	: 28	: 33480	: 2095000	: .196	: 4100	
Sept.	: 34	: 40650	: 2540000	: .184	: 4670	
Oct.	: 30	: 35870	: 2242000	: .179	: 4010	
Nov.	: 24	: 28700	: 1792000	: .187	: 3350	
Dec.	: 29	: 34670	: 2165000	: .183	: 3960	
Total.....		591020	43277000		111550	

31 January, 1914.

FIELD NOTES.

Yuma.

During the week ending January 3, the maximum temperature was 76, minimum temperature 28, and greatest daily range 41.

Leveling on Field B-13 to 17 was completed and made ready for borders. All remaining cotton stalks on the farm were cut and hauled to the sandy stretch of road on the south line.

Corn was harvested from Borders D-35 and 37, with the following yields:

D-35 (.146 acre) planted to "Laguna" yielded at the rate of 11.4 bushels per acre.

D-37 (.154 acre) planted to "Selection No. 157" yielded at the rate of 14.2 bushels per acre.

The harvest from sweet potatoes on Plat A-10₃ gave a yield of 6.87 tons per acre of marketable potatoes. The variety grown was White Vineless.

Various farm tools and vehicles on the station were repainted.

During the week ending January 10, the maximum temperature was 79.5, minimum temperature 31, and greatest daily range 46.

Leveling was begun on "A" series, borders to be numbered 22 to 25. Arrowweed was cleared from a portion of Field C-1 to 5. Work was begun on clearing and repairing farm laterals.

The cotton gin was opened this week for the ginning of the last picking of settlers' Egyptian cotton.

During the week ending January 17, the maximum temperature was 75, minimum temperature 32.5, and greatest daily range 42. The latter part of the week was characterized by much cloudy, muggy weather, although only 0.095" rain fell. Thus far the winter season has been exceptionally open and weather conditions have been ideal for work. Figs lost their leaves, but have received very slight wood injury; bamboo, of the species Dendrocalamus strictus still grows without damage from cold; Eucalyptus is still growing. Late fall alfalfa plant-

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FIELD NOTES

Yuma (continued).

ings have made an unusual growth for the winter months. Row plantings of alfalfa on B-19 to 24 were thinned to proper distances.

Work in cleaning ditches has continued. Borders D-18, D-21 to 25, inclusive, C-19, 20, 23 to 26, inclusive, and A-12₂ and A-10₄ were plowed this week.

Ginning of the settlers' cotton was completed January 17, and the final ginning of the season's farm cotton was completed January 19. The total sale of Egyptian cotton from the Bard locality will be twenty-nine bales.

SUGAR BEET CONTRACT
of the
SCOTTSBLUFF SUGAR COMPANY.

The following circular letter has been distributed among the sugar beet growers of the Scottsbluff Project:

Scottsbluff, Neb.,
January 19, 1914.

TO OUR GROWERS:

Re: 1914 Beet Contract.

The 1914 beet contract is now in the hands of our Field Men and is identically the same as the contract in force during the past year except that the price to be paid for beets has been reduced 50¢ per ton. This reduction has been decided upon only after a most careful scrutiny and thorough consideration of the conditions affecting the production of beets and the manufacturing and marketing of our sugar. These conditions have been foreshadowed for some time, but their serious nature has not been generally recognized. We sincerely regret the necessity of any reduction, but the selling price of sugar, present and prospective, leaves us no alternative.

Re: 1914 Labor Contract.

The 1914 labor contract is also in our Field Men's hands and carries a reduction from \$20.00 per acre for the hand-work to \$18.00 per acre plus a bonus of 25¢

31 January, 1914.

Scottsbluff Sugar Company Contracts (continued).

per ton for each ton in excess of an average yield of twelve tons per acre. This re-arranged labor contract leaves it still possible for your labor to make \$20.00 per acre as in the past on a yield of twenty tons per acre, but if your crop fails to exceed twelve tons per acre the cost of your hand-work is limited to \$18.00 per acre. This new contract will not only lessen the cost of producing your beets, but will tend to secure better work on the part of your hand-workers generally, and an increased tonnage per acre as a result thereof.

Re: 1914 Tonnage Bonus Payment.

The "bonus payment" in effect for the season 1913 is hereby renewed for the year 1914. In order that all growers may fully understand the conditions under which this "bonus" is payable, we repeat here the guarantee of 1913, as follows:

"If the total delivered crop amounts to 135,000 tons or more, we will pay 50¢ per ton extra. As it is necessary that the crop be delivered to us in good physical condition in order to enable us to make this bonus payment, only those growers who silo twenty-five per cent or more of their crop and who deliver their crop in good condition will be eligible to participate in the bonus settlement".

The above "bonus" shall govern for the season 1914, and this letter should be retained as our guarantee to such effect.

On account of the adverse conditions referred to above, and because we are unable to profitably work deteriorated beets such as we have been working during the past three weeks, we now propose to limit our contracted acreage for this season to a total which is somewhat less than the total acreage accepted last year; consequently, we suggest the advisability of your seeing, at once, the Field Man in charge of the district in which you live, as when this limit is reached we will be obliged to decline all subsequent applications for contracts.

Wishing you every success for the coming year, we are pleased to remain

Yours very truly,
THE SCOTTSBLUFF SUGAR COMPANY.
By EDMUND SIMMONS, Manager.

7 February, 1914.

FIELD NOTES.

San Antonio.

During the week ending January 31 the maximum temperature was 83.5, minimum temperature 22, and greatest daily range 39. 22 is the lowest temperature experienced at San Antonio during the current winter.

Plowing during the week was continued. AB8 and D4 were completed and a part of A3-2 was plowed. Pruning of the orchard on E4 was completed.

The oats in the oat pasturing experiment are not making much growth at this time. This is largely due to the cool weather. As the number of cows pastured is at the rate of 4 to the acre it was not expected that there would be sufficient forage for them during the entire winter, but the past week is the first time that the stock have not apparently had sufficient grazing.

The Bexar County Farmers' Institute met at the Station on Saturday. It was decided at this meeting that throughout the year the Institute will meet here frequently so that the farmers can keep in close touch with the work of the farm.

Truckee-Carson.

During the week ending January 24, the maximum temperature was 58, minimum temperature 21, and precipitation .49 inch.

One man and team were hauling manure to Field S throughout the week. Redwood lumber was secured and cut out for bridges over some of the larger ditches. All the trees in the Forestry, Field C, were pruned. One circular letter on "Grain Smuts" and one on "Potato Eel Worm" were mimeographed and placed in envelopes ready for distribution. They will be mailed to local addresses about March 1.

7 February, 1914.

FIELD NOTES.

Truckee-Carson (continued)

Arrangements are being perfected for doing some cooperative work with corn and potatoes on the farm of A. R. Merritt. Twenty-six varieties of each crop will be tested.

LAUNDRY

Subvouchers to be secured when practicable.

Memorandum No. 63, dated January 28, and signed by the Assistant Secretary, reads as follows:

"Under date of January 17, 1914, the Auditor for the State and Other Departments called attention to Section (o) of Paragraph 9 of the Fiscal Regulations of this Department, which contains a provision that subvouchers for laundry must be obtained when practicable. He states that the reservation "when practicable" presumably contemplates such cases as those where the washing is done by Chinese laundrymen, who do not ordinarily give receipts or the occasional cases where for other reasons written acknowledgement of payment cannot be obtained. He states further that under the present custom practically no receipts appear in support of the numerous laundry charges in the accounts paid by the Disbursing Clerk of this Department.

It is possible that officers and employees have in many instances come to look upon the laundry expense merely as a fixed additional travel allowance of 20 cents a day, or \$1.25 a week, while the privilege carried by the regulations is a privilege to claim reimbursement only for amounts actually expended, and in future receipts will be required in support of all laundry charges, or a written statement must be made showing the impracticability of obtaining receipts.

(Signed) B. T. Galloway,
Acting Secretary.

7 February, 1914.

TRAVEL

Amendments to Fiscal Regulations in regard to per diem in lieu of subsistence expenses.

Memorandum No. 64, dated January 29, 1914, and signed by the Assistant Secretary, amends Fiscal Regulations as follows:

"Paragraph 15 of the Fiscal Regulations is hereby amended as follows, effective March 1, 1914:

By striking out all of sub-paragraphs (1), (3) and (4) and substituting therefor:

(1) In computing the per diem allowance for fractional parts of a day, the day will be considered as consisting of four equal parts, corresponding to breakfast, dinner, supper, and lodging, and for each such fractional part of the day for which expenses are incurred, one-fourth of the per diem allowance will be granted. In traveling by railroad or ship, when the expense for berth in sleeping car or stateroom is paid by the Government, the per diem allowance will not be reduced by reason thereof.

(3) Letters of authorization may designate certain cities in which unusually high hotel rates prevail, and provide that the per diem rate specified in the letters of authorization shall be increased one dollar per day in each of the cities. In computing the per diem allowance at the higher rate in these cities, the day will be considered as consisting of four equal parts, corresponding to breakfast, dinner, supper, and lodging, and for each fractional part of the day for which expenses are incurred in these cities, one-fourth of the per diem allowance at the higher rate will be granted.

(4) For days on which an officer or employee is in a camp or other place where meals are furnished by the Government, or on a ship on which the transportation charge includes meals, he may, under authority from the chief of his Bureau, be allowed actual expenses incurred on such days, or a fractional per diem for those parts of the day, during which he was placed at personal expense for meals or lodging.

(Signed) B. T. Galloway,
Acting Secretary.

14 February, 1914.

FIELD NOTES.

Yuma.

During the week ending January 24, the maximum temperature was 72.5, minimum temperature 30, and greatest daily range 40.5.

Plats A-1, 3, 4, 13-₃ and C-19 were plowed. Work was continued in repairing ditches and raising the banks.

Several varieties of vegetables were planted in the garden on A-12₂.

The recently turned under alfalfa plats A-9 to 12, C-6 and 7, and D-6 to 14 were disked. The work of leveling on A and B was continued.

A-9 was manured and furrowed preparatory to planting melons.

Truckee-Carson.

During the week ending January 31, the maximum temperature was 51, minimum temperature 20, and precipitation .71 inch.

Manure was hauled to Plats S-1 and 2. Two men were occupied the greater part of the week cleaning irrigation ditches. Four bridges were constructed over some of the larger irrigation ditches. The leveling of Field C was continued.

Publications by Mr. Knorr.

Mr. Knorr has recently completed the manuscripts for two publications based on the work at the Scotts-bluff Experiment Farm. One is entitled "Vegetable Gardens on the Irrigated Farms of Western Nebraska". It suggests methods of growing thirty different garden vegetables which have been successfully produced at the Experiment Farm. The second bulletin is entitled "Growing Irrigated Field Crops in Western Nebraska". The first named bulletin will consist of twelve printed pages and the second of about sixteen. Both papers will be published by the Nebraska Experiment Station.

14 February, 1914.

Letter from the Secretary of the Interior
to Water Users.

The following is a copy of a letter addressed to a water user on the Belle Fourche Project. Presumably, the same letter has been sent to each water user on the Government Projects. This letter is included in the Weekly Bulletin because it expresses the views of the Secretary of the Interior on a number of points of vital interest, not only to water users on Government Reclamation Projects but also to all who are concerned with the Reclamation movement.:

DEPARTMENT OF THE INTERIOR,
Washington.

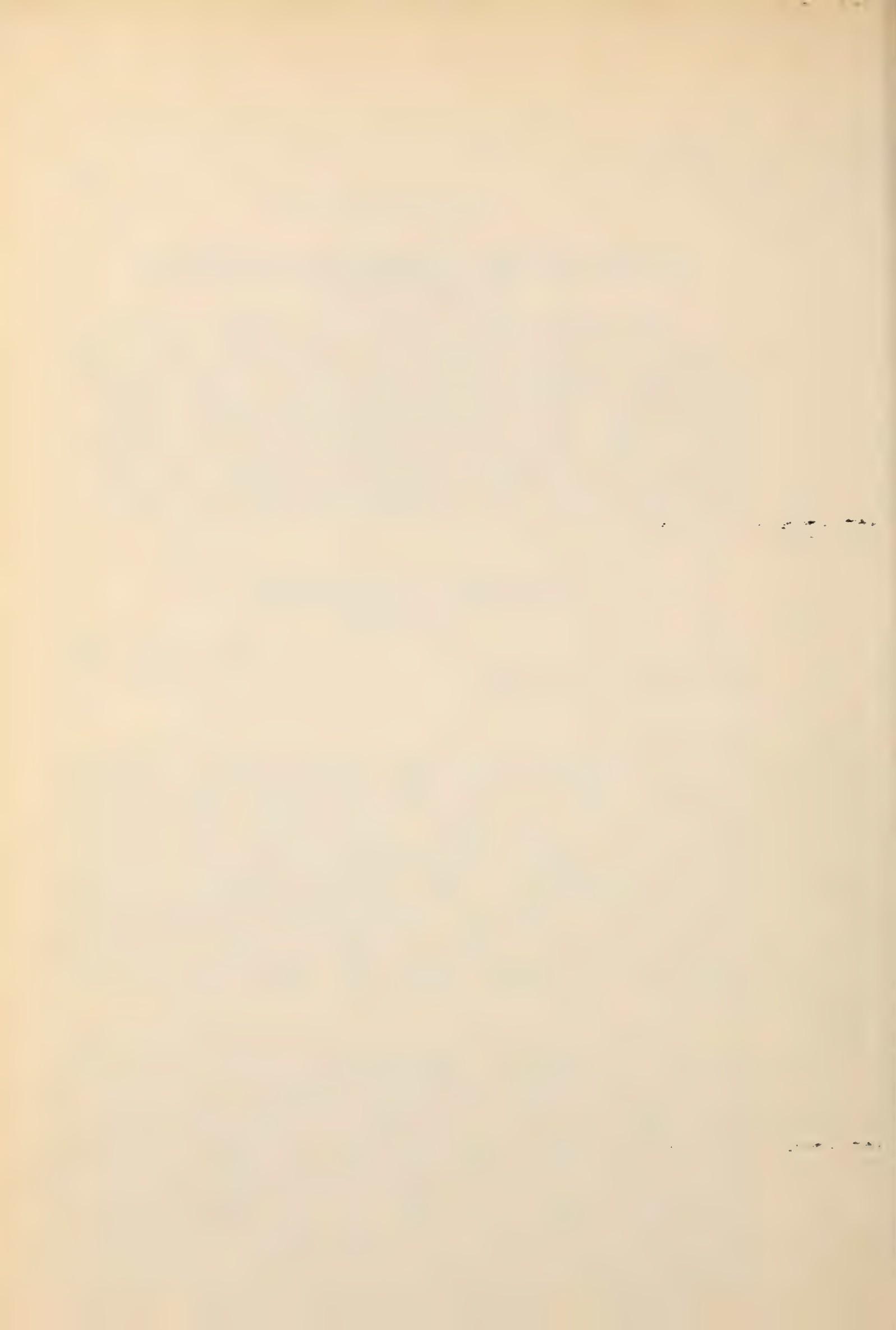
January 16, 1914.

Mr. Oscar R. Mathews,
Newell,
S. D.

Dear Sir:

I am sending you this letter in which I discuss various questions affecting all of our reclamation projects, that you may know the effort that is being made to meet your needs. This letter requires no answer. It covers what appears to me to be some of the more important problems confronting both yourself and the government. The question always before us is, whether or not the United States can successfully conduct a large business enterprise upon business principles without injustice to its citizens and without imposing a too heavy burden upon those with whom it deals.

It may be true that hitherto the Government has expected too much of water users, and it may be equally true that water users have expected too much of the government. However that may be, there is surely a safe middle ground where neither shall expect too much of the other and where each shall be ready to recognize the other's due on the safe and solid basis of the needs and possibilities of the one and the fair and just compensation of the other; and all this without thought or suggestion of largess or of imposition. I would deal with you as you would deal with another, yielding nothing as charity, but dealing together as men as brothers on the basis of what is reasonable and just. Though



14 February, 1914.

Letter to Water Users (continued).

there may be some among you who have hoped that eventually the government would not collect its due, I believe that most of you have never entertained a thought of escape from your obligations to the government.

I have given many months of close personal study to the problems involved. I have visited you in your homes, in your fields and in your meetings; I have taken counsel and advice of men long in the service, of representatives water users, and what follows hereafter is the result of this study, advice and serious consideration.

After personal contact with thousands of settlers on our reclamation projects, I find that we have gathered together from all parts of the United States a class of men and farmer above the average in ability and intelligence; they are generally men of high purpose, resolute, self-dependent and determined. These men are companioned by superior women. I have no sympathy with that view which attributes to you, and to your shortcomings only, whatever in your present situation may be uncomfortable or unpromising.

With the admission that the past conduct of affairs has not been unqualifiedly without error, and that future policies are subject to correction when found erroneous, I think we may fairly proceed upon common ground to reason together to the end that we may now agree as to what, in the light of present knowledge, appears to be just and equitable, as between you and the government.

The Farm Unit.

The most difficult duty imposed upon the Secretary of the Interior is that of determining the "area of land necessary for the support of a family." The law wisely requires this to be done, not only to prevent speculation in lands, but in order that there shall be farms for all who desire them. By law and by tradition 160 acres have been considered necessary for the support of a family in the United States. But land was plentiful when this unit was established, transportation was difficult and conditions of farm life burdensome. Seldom in the pioneer

14 February, 1914.

Letter to Water Users (continued).

days was a quarter of the 160 acres farmed. There was the woodlot, the pasture and the fallow ground. Even in humid regions good farm practice retired one-half the cultivated area each year for recuperation by summer fallowing. So that 160 acres of land even in the humid prairie regions was equivalent to an annually farmed area of only 80 acres. In wooded countries the labor and cost of clearing and subduing the land was greater than in the desert regions today under irrigation, nor could the acreage subdued in one average man's lifetime equal one-half his holdings. Even today in the States of Wisconsin, Oregon, Washington, California, Alabama, Louisiana, Mississippi, and in other southern States the cost per acre of clearing and grubbing "logged-off" timber lands is greater than the cost of reclaiming desert lands by irrigation. Much of this land is lying idle and unproductive for that reason. Few men would take 160 acres of such land conditioned upon clearing 80 acres and subduing it by cultivation within 10 years' time. So that by every measure of comparison with which I am familiar I can find no justification for a farm unit greater than 80 acres on any reclamation project, even under the least favorable of climatic conditions. There are hundreds of thousands of citizens willing to take up farm units of 80 acres or less. Every man to whom 160 acres is given deprives some other man of a home.

I must therefore decline to yield to the demand from many quarters to fix farm units at 160 acres of irrigable land. In no case will I approve greater than 80 acres, except where existing contracts with private land owners made previous to my incumbency have been made upon a larger basis. The 80 acres farm unit will be fixed only in those regions where climatic, soil and market conditions make so large an area appear to be necessary, and even in such regions 40-acre tracts lying near to towns or prospective towns are deemed ample for the support of a family.

One great need of agricultural regions is agricultural laborers and artesans. If possible I would establish a few 5 and 10-acre homesteads for such to relieve them of the disadvantages of tenantry and to

14 February, 1914.

Letter to Water Users (continued).

encourage them to settle in the vicinity of the larger farms. The cost of reclaiming 160 acres by irrigation is too heavy a burden for the average farm family to labor under. Thousands of farmers of modest means now renting eastern lands could be located on these small tracts and could with their labor earn enough to pay reclamation costs and at the same time acquire a home of from 5 to 10 acres, but would probably fail if they attempted to acquire an 80, a 40 or even a 20-acre tract. The man who undertakes to pay the cost of reclaiming 160 acres must needs be a man of large capital to start with. Less is required for 8- and less for 40, so that as the size of the farm unit is reduced, the number of families on the land may be increased, so also is reduced the amount of capital required of that family to start with, and through larger population making easier many of the problems of pioneering.

In those fertile and hospitable southern regions where the growing season is almost continuous there is no defense whatever for farm units in excess of 40 acres. In California the Little Landers are demonstrating even an acre to be sometimes enough, long ago in the citrus belt men have shown the world that 10 acres is enough. In the Salt River Valley I have recently fixed the farm unit at 40 acres and I am now besieged with demands to reconsider and fix this at 160 or some other larger unit. I cannot concede the justice of these demands nor the force of the arguments submitted. Forty acres well tilled in the Salt River Valley is larger than I believe to be absolutely necessary for the support of a family. I have conceded 40 acres, but in doing this I feel that I have virtually deprived one or more families of an opportunity for a home on each 40. If I were to name 160 acres it would virtually be letting one family have land I believe to be sufficient for the support of several families. I believe you would not have done otherwise had you been in my position.

Though I am convinced that the farm unit should not exceed 80 acres on any reclamation project it does not appear to me to be just that entrymen who filed on government lands subject to the Reclamation Act should be compelled to surrender their holdings in excess of the es-

14 February, 1914.

Letter to Water Users (continued).

tablished farm unit without compensation. These men are entitled to consideration on account of the hardships they have endured while waiting for the projects to be opened and for water to be delivered, and each such should be permitted to hold one farm unit and be allowed to dispose of the remainder in such way as to fully remunerate him. But it should be required that, within one year after making proof of residence, cultivation and improvements, as required by the homestead law, or within one year after the farm unit plats have been approved, the entryman should be compelled to sell the excess land in farm units as established, or in parcels of less area. By this means every man who now claims a quarter section could retain 160 acres for one year after successfully making final proof, but if the survey made four units of these 160 acres, he should be required within one year to sell three of those units. These irrigated lands are valued at \$20 to \$100 per acre. If sold at these prices the entryman will have from \$3,400 to \$12,000 to invest in improvements on the unit he retains. This should be a sufficient reward for the industry and sacrifice of those who have waited so long for the settlement of this vexed question. There seems to be no justice in the demand to permit patent to be issued for 160 acres. To do so would be to encourage speculation and the withholding of irrigable land from cultivation. Under the above plan patents would only issue to one person for the area embraced in one farm unit, as these are now or may hereafter be fixed. The assignees of the original entrymen would receive patent when the provisions of the law have been complied with. If it were possible I would limit the delivery of water to one farm unit only for each owner. There appears to be no legal means of accomplishing this as to lands now in private ownership.

Costs of Operation and Maintenance.

This is a subject so vitally connected with size of farm units that it must be considered in connection therewith.

14 February, 1914.

Letter to Water Users (continued).

If authority shall be granted by Congress, I propose:

That hereafter no part of building costs nor betterment costs shall be charged to this account. Neither shall charges be assessed and collected in advance upon an estimate as to what may be the expense of a given year's service, except in case of default. Full and explicit monthly statements of the cost of operation and maintenance shall be made monthly and posted in all the offices of the Reclamation Service on each project and in the office of the Water Users' Association. The totals shall be carried forward from month to month and on November 30th of each year the total cost as shown by such statements shall be increased by 5 percent to cover the cost of collection and the total thus obtained shall be assessed proportionately to the amount of water used upon each acre of irrigable land in the project.

The charge assessed upon each farm unit shall not be less than a reasonable minimum to be established by agreement with the Water Users' Association on each project. This minimum charge shall be assessed against the total irrigable area of each farm unit and shall be the same if the farm unit is uncultivated and uses no water as if it were cultivated and irrigated.

These charges shall fall due and be payable December 1st and if payment is made on or before December 15th the 5 percent added to maintenance and operation expenses to cover the cost of collection shall be rebated. If not paid by January 1st a penalty of 1 percent per month for each month of delinquency or for each fraction of a month shall be added.

The above provisions recommend themselves to me as being reasonable regulations and such as should be desired by the water users. Operation and main-

14 February, 1914.

Letter to Water Users (continued).

tenance charges must be paid. If farming operations are not sufficiently profitable to cover this service then irrigation is a failure. There can be no valid excuse for neglect to pay such charges and the very existence of the Reclamation Service and the water users' organizations as well depends upon prompt payment.

I trust that water users will soon be taking over the management and operation of the projects. There should be a well-ordered definite system as to such collections, and calculated to produce the best results. I am advised that the cost of collecting delinquent assessments amounts to more than 5 percent thereof. The water user who promptly pays his assessments should not be burdened with a share of this cost as he is at present. By providing a rebate or discount of 5 percent and not less than 5 cents per acre to the man who pays within 15 days, this burden is lifted from him. The delinquent, however, should be required to pay the full amount and 1 percent per month additional for each month, or fraction of a month, for his delinquency. It should also be provided that any water user who is delinquent for operation and maintenance charges for the then current year on an estimated basis of 25 percent increase over the charge for the preceding year, ended November 30th. It is believed that these provisions will encourage the thrifty to pay promptly and compel the unthrifty to pay eventually all that may be due. If water is not turned on May 1st for delinquents, unless charges are paid in advance for the coming season and at an increase of 25 percent over delinquent charges, it is believed the delinquent charges will be paid to escape the higher advance payment.

It must be apparent to you that if there is a large accumulation of unpaid charges due the Service there must be some adjustment made to recover the loss. In private business this loss is recouped by an arbitrary charge which rests upon the paying customer the burden of unpaid accounts. The government is not perhaps justified in adopting this business rule, but it is justified in adopt-

14 February, 1914.

Letter to Water Users (continued).

ing such restriction as will reduce such losses to a minimum.

I want you to think this over carefully and remember that sooner or later the burden of carrying delinquents will fall upon your shoulders, that you and not the impersonal government will have to deal with them. The question is, shall the government enforce a hard and fast rule, or shall it leave you heir to an unbusinesslike and inefficient system.

The man who tries to hold 160 acres and pay operation and maintenance charges has four times the burden of the man with 40 acres and while it is true that he has four times as much land, it is also true that no 160-acre tract ever seems to produce as much per acre as 40 acres. The projects which conform most nearly to the 40-acre standard have the highest average yields. The margin of profit is much greater. It follows therefore that there will be fewer delinquents where the 40-acre tracts prevail than where the larger are. The total delinquencies for this account on Huntley project are less than 9 percent, the forfeitures less than 1 percent. Huntley has generally 40 acres of irrigable land in each farm unit. On Lower Yellowstone, where the land is chiefly in large holdings, the delinquencies are over 73 percent. I think it may be said to be axiomatic that land greed induces land poverty. You men who are making homes for yourselves and your families over-reach yourselves when you struggle under a burden to acquire title to a large tract. The small farm, the good farm, first; then out of its profits, the large farm; rather than the large farm, the large debt, the big failure and the big regret.

Economy in the Use of Water.

Perhaps the most vital question confronting the water user today, and really of greater importance to his future welfare than the question of deferred pay-

14 February, 1914.

Letter to Water Users (continued).

ments for the water used, is the determination of what is the proper use to be made of the water which is available for use upon the land. The prevailing disposition appears to be to use more water than is absolutely necessary for the best results on plant growth. The experts of the Service and those outside of the Service who have been longest accustomed to irrigation and who have developed all that is known on the subject, as applied to agriculture in this country, are unanimous in recommending a system of rotation, payment to be made in proportion to increased quantity, and of measuring according to predetermined schedule the amount of water that shall be delivered to each user to be regulated in accordance with the character of the land and the nature of the crops. The deleterious effect of the use of too much water upon the land is becoming more evident with each year.

The accumulation of ground water with a resulting water-logging of large areas is but a reproduction of the natural conditions prevailing in humid countries where rainfall is excessive and the run-off limited.

If farmers will insist upon pouring water upon the higher lands in excessive quantities, not only will the plant food be leached from the soil, but the encroachments of the ground water will continue year by year and eventually will neutralize the benefits of irrigation by destroying more land than is reclaimed.

Not only does this bad result appear to be inevitable, but in pursuing this practice you are drawing from this available supply for acres that do not require it and depriving acres which are much in need of it of their share of the available water supply. Reasonable restraint should be exercised by all and that economy practiced which will result in the most beneficial possible use of the water.

Building Charges.

This subject of course most intimately affects you and your prospects. If you are to win your home and

14 February, 1914.

Letter to Water Users (continued).

your independence you must pay the cost, the whole cost, of reclaiming the land you hold. Not only because the law requires it, but because it is right that you should do so. There may be differences of opinion as to what may be properly charged to that cost. I own to some doubts as to whether you may not have been charged with some items of cost that were more properly chargeable to some other account. I do not know this to be so, but I propose to find out and to let you know, to relieve you, if possible, of any charge that may be unjust and to issue public notices definitely and finally fixing the cost as soon as this may legally be done.

It is possible that Congress may grant power to the Secretary of the Interior to extend the time of repayment to the reclamation fund so that the whole sum may fall due at the end of 20 years instead of 10. I favor such an extension and have so advised Congress in my annual report.

It is my intention to determine this cost as accurately as possible by means of a board of review or a committee on each project to consist probably of an engineer of the Reclamation Service, an expert accountant representing the Secretary of the Interior and an engineer or accountant or other representative of the water users to be selected by the Water Users' Association. All items of cost assessed against each project shall be thoroughly reviewed and any items that may be objected to by the water users shall be thoroughly examined into and the justice or injustice of the charge determined at an open hearing. But this course must necessarily be dependent upon the agreement of the water users that the costs thus determined upon shall be final and binding upon them and shall form the basis of a new contract with the United States conditioned upon payments indicated as above or spread over a period of 20 years if so authorized by Congress.

At the same time and by the same board or committee there should be considered the question of additional construction costs made necessary by extensions, betterments, improvements or drainage or power systems. The

14 February, 1914.

Letter to Water Users (continued).

necessities of each project should be thoroughly entered into with a view to the final determination of a "completed cost" for each project the completion contemplated to include all necessary enlargements of the project works, particularly of drainage works.

Residence and Cultivation Requirements.

There is another important matter in which I think you will agree with me, namely, that any reduction of existing terms of payment should be extended, if at all, with caution, to those land owners who are neither residing upon their lands nor cultivating them. There is, unfortunately, a class of investors, a few in number it is true, who are holding areas of considerable size including lands for which water has been provided at the cost of the project and who are living in cities or remote localities. Many of these are not cultivating the ground, or, if using it at all, only in the most perfunctory manner. With these are to be classed certain speculators or dealers in real estate who have purchased lands at low prices or have obtained relinquishments, due to the inability of the former owners to retain the land, and who are holding these lands out of use in the hope of obtaining a profit by raising the prices rather than by raising crops. The result is that in the midst of a tract of highly cultivated small farms, there is occasionally a section or quarter of section of land which has been left untouched, or perhaps merely ploughed up at some time and which has now grown up to weeds and serves as a refuge for jack rabbits and various kinds of vermin; weed seeds are blown from these fields and infest the neighboring cultivated land; the presence of these deserted areas is not only an eye sore but a direct financial injury to all of the neighbors.

The owners of these lands are endeavoring to make a profit largely out of the labors of the owners of the surrounding lands who, through their toil in the field, are gradually increasing land values in the vicinity. In other words, they are not only freely enjoying the

14 February, 1914.

Letter to Water Users (continued).

bounty of the government, in providing water for the land, but in like way are indirectly levying a toll upon the labor and self-denial of their neighbors.

No one can argue that these men should have the benefit of extension of time in making payment, as through such benefits it will enable them to hold these lands still longer out of cultivation, advance the prices, increase the load on the newcomer, and further delay the ultimate development of the community and its successful growth.

The injury to the community and to the state lies not wholly in keeping these lands out of profitable use but also by not permitting the rapid growth of resident population. By keeping away many desirable citizens, the burden of pioneering laid upon the remainder is increased notably in the maintenance of roads and of schools, and of all the local institutions so necessary to a growing community.

Employment of Settlers in the Service.

I am convinced of the justice of the very general demand that preference shall be given in the employment of assistants on various projects to the settlers upon the lands watered. In all capacities for which a water user is capable of qualifying under the Civil Service rules and regulations, he should be given the preference, but his application for employment should have the endorsement of the Water Users Association, or of its Board of Directors.

I trust that we may have the hearty cooperation of all in bringing to a success these enterprises, and that this review of present problems may enable you to see more clearly the purpose of the Reclamation Act and the policy with which it is being administered.

Cordially yours,
(Signed) Franklin K. Lane.

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21 February, 1914.

FIELD NOTES

Truckee-Carson

During the week ending February 7, the maximum temperature was 51 and the minimum temperature 17.

The work of cleaning irrigation ditches, putting in irrigation boxes and gates, and leveling Fields "C" and "Y" was continued during the week.

During the week ending February 14, the maximum temperature was 62 and minimum temperature 20.

The work of leveling Fields "C" and "Y"; cleaning irrigation ditches, and hauling manure to Field "S" was continued throughout the week.

Cuttings were made of Norway Poplar, Chinese Balsam Poplar, Carolina Poplar, Tamarix Indica, Tamarix Africana, Tamarix Gallica, Saliz sp. S.P.I. # 22450, and the Russian Golden Willow, to be planted in nursery rows for distribution in 1915.

At a meeting of The "Friday Club" on the night of February 6th, Mr. Headley gave a talk on "The Planting and Pruning of Orchard Trees". The same talk, with a few additional lantern slides showing trees and shrubs suitable for general planting on the Truckee-Carson Project, was given Saturday night, February 14th, in the "Sheckler District".

San Antonio

During the week ending February 14, the maximum temperature was 70, minimum temperature 29, and rainfall 1.03 inches. There was sufficient rainfall to put the recently plowed land in good condition for spring planting.

All the fallow land was harrowed the latter part of the week. Plat B6-15 was subsoiled and B6-13 and 14 were plowed on the 11th. The orchards on A3 and B3 were disked and harrowed for the first time this winter.

A part of the week was devoted to painting the greenhouse, plant shade, and the office floors.

Mr. Hastings and Mr. Townsend returned from a three days' trip to Boerne on the 9th.



21 February, 1914.

COST OF SILAGE.

The following item appears in Hoard's Dairyman, for January 9, 1914:

"Investigations conducted by the Dairy Division of the U. S. Dept. of Agriculture during the past few years with 87 silos in various parts of the United States indicate the cost of filling to be an average of 87 cents per ton. The cost of growing the silage crop was \$1.58 per ton on the average, which added to the filling cost makes the average total cost of silage \$2.45 per ton. However, no definite statement can be made as to the exact cost of silage as so much depends upon the yield per acre, cost of production, and other conditions that vary so greatly in different sections of the country. For the individual farms under consideration the cost of silage varied from \$1.10 to \$5.43 per ton. The investigators state that \$1.50 to \$3.50 per ton represents the limits between which most of the silage is produced.

THE "HOGGING" EXPERIMENTS OF 1913.

In going over the detailed reports of the experiments in utilizing alfalfa and corn for pork on the rotations at Huntley, Belle Fourche, and Scottsbluff, I have been impressed with the need of working out a clear and simple way of stating these results.

There are so many varying factors involved that it is hard to make direct comparisons of the results without reducing the data to a common basis.

This has been done in the accompanying table. It is true that this table does not include all the available data. Only the more significant items have been included here. Two of the headings in this table may not be perfectly clear at first. These are the "% Daily Gain" and "Daily return per acre" columns. The daily percentage gain is derived by the use of the formula for deter-

21 February, 1914.

The "Hogging" Experiments of 1913 (continued).

ining the rate of compound interest. This method is used because it is obviously incorrect to base this percentage for each day of the period on the intial weight for the period. Each day's gain is added to the weight of the pervious day just as in compound interest the interest for each period is added to the principal.

This percentage daily gain is derived as follows: Divide the final weight by the initial weight, obtain the logarithm of the quotient, divide this logarithm by the number of days of the period involved, and find the antilogarithm of this quotient; this antilogarithm is the daily percentage of gain.

The daily return per acre is obtained by multiplying the average daily gain by 7 cents, the estimated value per pound, and subtracting from the product cost of the corn fed each day, and multiplying this remainder by 4 to put the factor on the basis of one acre.

The results from Huntley and Belle Fourche are somewhat fragmentary and unsatisfactory as compared to those from Scottsbluff. This is largely due to the fact that suitable pigs could not be secured at the right time. An effort will be made to secure authority this season to purchase pigs at these two stations.

It is highly desirable, of course, to get such stock as will utilize the alfalfa to the best advantage. To to this it is necessary to secure young or at least medium sized stock, and particularly to avoid stock that has been badly stunted.

It is expected that some additional hog pasturing experiments will be inaugurated this coming season at Scottsbluff. These experiments will be aimed to determine the relative value of continuous versus alternate pasturing alfalfa, and the optimum grain rations to be used on alfalfa pasture. Meanwhile, it seems important that in the pasturing experiment on rotation 65 on all three stations care should be used to carry about the same quantity of live weight per plat, and to feed the same grain ration, i. e., two pounds of corn per one hundred pounds of live weight.

In the following table there is summarized on a comparable basis the results of experiments in utilizing al-

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The "Hogging" Experiments of 1913 (continued).

falfa and corn for the production of hogs on the three field stations:

ALFALFA

Lot:	Days	No. of hogs	Initial weight	Daily gain per day, Lbs.	% gain per day	Total weight	Total gain per day, Lbs.	Daily return per acre.
(Huntley)								
1	10	6	292	.81	.81	3.5	.46	
2	31	12	720	.74	.74	6.0	1.03	
(Belle Fourche)								
1	59	3	460	.50	.50	2.3	.40	
2	35	3	550	.39	.39	3.3	.08	
3	20	8	312	1.34	1.34	4.8	.67	
(Scottsbluff)								
1	61	5	544	.86	.86	6.2	1.06	
2	14	8	373	1.48	1.48	4.5	1.02	
3	53	12	475	1.37	1.37	9.5	1.86	
4	20	6	413	.63	.63	2.9	.42	

CORN

Days	No. of hogs	Initial weight	Daily gain per day, Lbs.	% gain per day	Total weight	Total gain per day, Lbs.	Total value per acre.
(Huntley)							
23	4	328	2.04	2.04	8.3	53.75	
(Belle Fourche)							
11	8	408	2.67	2.67	12.7	39.20	
(Scottsbluff)							
28	6	547	1.38	1.38	9.0	70.80	

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The "Hogging" Experiments of 1913 (continued).

The percentage daily gain has been computed on the logarithmic basis, the gain per day is the average for each period, and the daily return per acre is the result after deducting the cost of the grain fed on the alfalfa pasture, rating it all at \$20.00 per ton. The meat is rated at 7 cents per pound live weight.

C. S. S.

APPOINTMENT OF ERNEST W. CURTIS.

Mr. Ernest W. Curtis, of Oregon, has been appointed Assistant in Dry Land Agriculture and assigned to the Truckee-Carson Experiment Farm to assist Mr. Headley. He will be given charge of the experiments on alkaline soils of the "Y" series, and of the laboratory work.

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FIELD NOTES.

Yuma

During the week ending January 51 the maximum temperature was 77, minimum temperature 30.5, and greatest daily range 36.5.

Much work was done in cleaning and repairing irrigation ditches. The silt deposit of the past season was considerable.

Sash for a three-frame hot bed was secured, and the hot bed constructed and planted to various vegetable seeds. Bottom heat is furnished by a fire pit burning mesquite roots and stumps.

Threshing of alfalfa seed tests was begun. The small "Baby Vibrator" separator was used to fill the place of a clover huller. Nearly all seed was threshed from the straw but some was badly broken and cracked.

During the week ending February 7, the maximum temperature was 75, minimum temperature 27.5 and greatest daily range 46.5

Alfalfa threshing was completed. The yields will be reported later. Borders to be planted to alfalfa were manured with cotton seed as follows:

B-9 and 1C 5732 lbs.

B-14 3350 lbs.

This was whole seed disked in just before seeding but planting at this time will likely allow the alfalfa to get a start before the cotton germinates and has to be mowed. Chilian alfalfa was seeded to borders B-9 to 12, inclusive.

A variety test of water melons and cantaloupes was started on A-9. Two hundred rose cuttings were set for rooting in nursery A 10-1, also, fifty cuttings of Rosa bracteata received from San Antonio, Texas. Pomegranate plantings on C-18 were pruned and cuttings made for propagating and distribution of the best varieties.

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QUALITY OF IRRIGATION WATER AT SIX FIELD STATIONS
in 1913.

In order to get some definite knowledge regarding the quality of the irrigation water used at the field stations operated by this office, samples were taken during the irrigation season in 1913 and sent to Washington for analysis. Samples were secured from Yuma, Truckee-Carson, Umatilla, Scottsbluff, Huntley, and Belle Fourche. The analytical work was done by Mr. J. F. Breazeale, of the Bureau of Chemistry. Determinations were made of the total soluble salts and of lime (CaO), magnesia (MgO), potash (K_2O), soda (Na_2O), carbonates (CO_3), bicarbonates (HCO_3), chlorine (Cl), sulphates (SO_4) and nitrates (NO_3). It was not possible to analyse the silt found in the samples, as in most cases the quantity was too small. It is planned to study the silt conditions further in 1914. The results of the water analyses are reported below, together with some similar data pertaining to irrigation water used in other parts of the West.

Yuma.

At Yuma six samples were secured on six dates from May to October. The samples were taken from the intake of the experiment farm lateral. The results are given in Table I.

TABLE I.
Salts in parts per 100,000

Date	Total										
	Soluble	CaO	MgO	K_2O	Na_2O	CO_3	HCO_3	Cl	SO_4	NO_3	
May 8	24.4	7.2	2.8	0.9	6.6	T	25.2	4.3	4.0	None	
June 18	20.6	5.4	2.2	0.5	4.5	1.6	8.4	2.3	5.9	"	
July 17	30.1	6.6	2.9	0.9	2.7	0.5	13.8	4.2	10.1	"	
Aug. 26	50.8	11.8	3.5	1.1	10.1	T	18.0	9.8	20.0	"	
Sept. 17	87.8	19.2	5.7	1.1	17.7	0.0	24.0	10.5	43.3	1.2	
Oct. 28	66.0	13.8	5.2	0.6	16.4	0.0	25.2	9.8	26.6	None	
Average	46.6	11.2	3.7	0.8	9.7	0.3	19.1	6.9	18.5		

The total soluble salts found in the six samples averaged 46.6 parts per 100,000, or .0466 percent. The quantity present varied from 20.6 parts per 100,000 on June 18 to 87.8 parts on September 17. Mr. Blair states that the sample taken on September 17 "represents a very silty

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Quality of Irrigation Water (continued).

flow of the Colorado which continued about five weeks. It is said that this is drawn from the Little Colorado. The deposit made in ditches and on fields when dry is very firm and resembles a soap stone in texture. When coating low new growth of alfalfa or other small plants it seems quite a hindrance. However, the deposit from one irrigation is enormous and should benefit our sandy lands greatly". It should be remembered that the figures in the table represent only the salts in solution in the water, and that no analyses were made of the silt. It appears that the salts in the sample taken on September 17 were chiefly calcium and sodium sulphates.

The table shows that small quantities of carbonates were found in the first four samples taken. Bicarbonates and small quantities of chlorine were found in all the samples. It will be noted that there was a steady increase in the sulphate content from May to September. Nitrates were absent from all the samples except the one taken on September 17, the silty water, which contained 1.3 parts per 100,000.

Truckee-Carson.

Five samples were secured from Truckee-Carson, from May to November. The samples were taken from the experiment farm lateral. The results of the analyses are given in Table 2.

TABLE 2.

Date	Salts in parts per 100,000							
	Total Soluble	CaO	MgO	K ₂ O	Na ₂ O	HCO ₃	Cl	SO ₄
May 1	13.0	2.0	1.1	0.6	3.7	9.0	0.7	T
June 4	14.0	1.2	0.9	0.7	4.8	10.2	0.7	T
July 9	27.2	6.8	2.2	1.1	3.2	10.2	0.7	7.6
Aug. 8	33.8	6.0	2.4	0.9	8.8	18.0	2.1	8.0
Nov. 12	21.0	4.0	1.8	0.7	5.5	19.2	1.4	T
Average	21.8	4.0	1.7	0.8	5.2	13.3	1.1	3.1

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Quality of Irrigation Water (continued).

The total soluble salts averaged 21.8 parts per 100,000, or .0218 percent, varying from 13 parts per 100,000 on May 1 to 33.8 parts on August 8. Small quantities of lime, magnesia, potash, soda and chlorine were found in all the samples. Carbonates were found in only one sample, that taken on August 8, which contained 1.1 parts per 100,000. Nitrates were absent from all the samples except the one taken on July 9, which contained a trace. Bicarbonates were relatively abundant throughout the season. As shown in the table, the sulphate content was strikingly low in all the samples.

Umatilla.

At Umatilla, samples of water were taken from the reservoir and from the river. Seven samples of reservoir water, taken from May to September, and three samples of water direct from the river, taken in May, June and July, were secured. The samples were taken from the two laterals at the experiment farm. The results of the analyses are given in Table 3.

TABLE 3.

Date	Water from Reservoir.							
	Salts in parts per 100,000							
	Total Soluble	CaO	MgO	K ₂ O	Na ₂ O	CO ₃	HCO ₃	SO ₄
May 5	9.8	0.8	1.2	1.2	1.8	1.2	5.4	0.6
June 7	9.2	0.8	1.1	1.3	2.5	0.0	8.4	0.7
July 13	6.6	1.2	0.9	1.3	1.0	1.8	4.8	0.5
Aug. 9	7.0	2.0	0.9	1.4	1.5	0.0	10.8	0.5
Aug. 11	7.2	2.0	0.9	1.2	1.4	0.0	9.0	0.6
Sept. 20	9.6	2.4	0.9	1.0	T	0.0	9.0	0.8
Sept. 27	9.2	2.4	1.1	1.2	T	0.0	9.0	0.6
Average	8.3	1.6	1.0	1.2	1.1	0.4	8.0	0.6

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Quality of Irrigation Water (continued).

Date	Water direct from River							
	Total Soluble	CaO	MgO	K ₂ O	Na ₂ O	CO ₃	HCO ₃	SO ₄
May 5	5.3	1.6	0.8	0.9	T	T	6.6	0.7
June 7	6.6	2.0	1.2	1.0	T	3.0	4.2	1.2
July 9	12.2	1.6	1.4	1.0	2.3	0.0	9.0	1.5
Average	8.0	1.7	1.1	0.9	0.7	1.0	6.6	1.1

An examination of the table shows that no important consistent differences between the reservoir water and that direct from the river were found. The discussion of the Umatilla water will, therefore, be based on the analyses of the reservoir water, of which the greatest number of samples were secured.

The total salt content of the seven samples averaged only 8.3 parts per 100,000, or .0083 percent. It varied from 6.6 parts per 100,000 on July 13 to 9.8 parts per 100,000 on May 5. Such a slight variation is within the limits of experimental error. The quantity of soluble salts found is negligibly small. A trace of chlorine was found in each sample, but no nitrates were found in any of them. The Umatilla water is unusually low in salts.

Scottsbluff.

Six samples, taken in May, July, August and September, were secured from Scottsbluff. These samples were taken at the intake of the experiment farm lateral at ditch "21 main". The results of the analyses are given in Table 4.

TABLE 4.

Date	Salts in parts per 100,000								
	Total Soluble	CaO	MgO	K ₂ O	Na ₂ O	HCO ₃	Cl	SO ₄	NO ₃
May 8	24.6	6.4	2.1	0.9	3.7	12.0	1.4	10.0	2.0
July 11	18.6	3.6	1.1	0.5	4.9	19.8	1.4	7.0	0.0
Aug. 1	35.8	12.8	2.2	2.4	5.4	15.0	2.1	9.3	0.0
Aug. 9	21.2	7.6	1.1	1.1	4.7	19.2	1.4	1.4	0.0
Sept. 1	20.2	6.4	1.7	1.2	2.4	9.0	2.1	10.0	0.5
Sept. 27	33.3	11.3	2.1	1.1	4.7	25.2	2.1	7.3	2.0
Average	25.6	8.0	1.7	1.2	4.3	16.7	1.7	7.5	0.7

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Quality of Irrigation Water (continued).

The total salt content of the six samples averaged 25.6 parts per 100,000, or .0256 percent. It varied from 18.6 parts per 100,000 on July 11, to 35.8 parts per 100,000 on August 1. Carbonates were found in only one sample, that taken September 1, which contained 0.5 parts per 100,000. Mr. Knorr states that "the sample taken on August 1 was taken after a heavy rain in the Rawhide district. The water leaves heavy, crusty deposits, which have the general appearance of 'Brule Clay'". This sample contained more than the average of all the substances determined except bicarbonates and nitrates; but the quantities present were not in all cases the highest found during the season. Of the sample taken on August 9, following heavy rains above Torrington, Mr. Knorr says: "The water contains a greasy feeling substance which forms a covering over the soil, tending to prevent water from going through". Examination of the water samples taken August 1 and August 9 affords little, if any, information as to the character of suspended matter. An attempt will be made in 1914 to secure large samples containing these materials so that they can be properly analysed.

Huntley.

At Huntley five samples were taken, in May, June, July, August and September. Four of these samples were taken from the main canal near the experiment farm, and one, that taken June 9, was taken from the lateral used in irrigating the Worden tract, four miles east of the experiment farm. The results of the analyses are given in Table 5.

TABLE 5.

Date	Salts in parts per 100,000						
	Total Soluble	CaO	MgO	K ₂ O	Na ₂ O	HCO ₃	SO ₄
May 26	13.4	2.0	T	1.9	4.7	12.0	1.9
June 9	14.2	2.0	T	0.9	5.0	7.8	2.7
July 19	15.5	5.2	T	0.8	3.6	9.6	3.4
Aug. 15	16.0	5.2	1.8	1.5	0.5	9.6	5.4
Sept. 10	22.0	4.8	2.4	1.4	3.0	13.2	8.3
Average	16.0	3.8	0.8	1.3	3.3	10.4	4.3

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Quality of Irrigation Water (continued).

The total salts at Huntley averaged 16 parts per 100,000, or .016 percent, varying from 12.4 parts per 100,000 on May 26 to 32 parts per 100,000 on September 10. The concentration increased somewhat as the season advanced. The chief constituents were bicarbonates, lime, soda and sulphates. There were no traces of carbonates, chlorine or nitrates in any of the samples. The Huntley water was rather unusually low in salts.

Belle Fourche.

Four samples were secured from Belle Fourche. These were taken in August, September, November and December. The November sample was taken from the "Wolf" lateral and the other three from the "Townsit" lateral. The results are given in Table 6.

TABLE 6.

Date	Salts in parts per 100,000						
	Total Soluble	CaO	MgO	K ₂ O	Na ₂ O	HCO ₃	SO ₄
Aug. 4	85.6	22.8	7.1	0.8	6.1	16.2	53.8
Sept. 15	86.0	22.2	7.2	0.7	7.3	16.2	55.1
Nov. 11	94.4	27.8	6.7	0.7	5.6	28.2	57.5
Dec. 5	93.4	25.2	7.7	0.8	7.4	16.2	60.9
Average	89.8	24.5	7.2	0.7	6.6	19.2	56.8

The total salt content of the Belle Fourche water samples was practically constant. The average was 89.8 parts per 100,000, or .0898 percent. The principal substances found were lime and sulphates, calcium sulphate being probably the chief salt. No carbonates or nitrates were found in any of the samples, but each contained bicarbonates. A trace of chlorine was present in each.

In the Weekly Bulletin of October 18, 1913, mention was made of a white salty deposit found after irrigation on the soil at Belle Fourche. It was stated that the white material was found to be a mixture of calcium sulphate and sodium sulphate. Such a deposit is not

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Quality of Irrigation Water (continued).

unexpected when the irrigation water contains as high a proportion of total salts, chiefly sulphates, as was found in the irrigation water. Since the salts in the water are principally the relatively harmless sulphates, it is not likely that any serious difficulty will result from the use of the water for irrigation.

Comparison of Waters from Six Farms.

In order to facilitate comparisons, the average results of the analyses of water from the six farms are given in Table 7. In the table, "X" indicates that the specified substance was found in only one sample, and "T" means that traces of the substance were found in several or all of the samples. The last column gives the number of pounds of soluble salts carried in an acre-foot of water, based on the average total salt content of all the samples in each instance. An acre-foot of water weighs 2,722,500 pounds, or in round numbers, 2,700,000 pounds. This latter figure was used in calculating the figures in the last column; that is, the parts of total salts per 100,000 was multiplied by 27.

TABLE 7.

Station.	Number of Samples	Salts in parts per 100,000.										pounds of salts per acre-foot of water.
		Total Soluble	CaO	MgO	K ₂ O	Na ₂ O	CO ₃	HCO ₃	Cl	SO ₄	NO ₃	
Yuma	6	46.6	11.2	3.7	0.8	9.7	0.3	19.1	6.9	18.3	X	1258
Truckee- Carson	5	21.8	4.0	1.7	0.8	5.2	X	13.3	1.1	3.1	X	588
Umatilla	7	8.3	1.6	1.0	1.2	1.1	0.4	8.0	T	0.6	...	224
Scotts- bluff	6	25.6	8.0	1.7	1.2	4.3	X	16.7	1.7	7.5	1.5	691
Huntley	5	16.0	3.8	0.8	1.3	3.3	0.0	10.4	0.0	4.3	0.0	432
Belle Fourche	4	89.8	24.5	7.2	0.7	6.6	0.0	19.2	T	56.8	0.0	2424

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Quality of Irrigation Water (continued).

The table shows that the lowest salt content was found at Umatilla - 8.3 parts per 100,000 - and the highest at Belle Fourche - 89.8 parts per 100,000. At Yuma and Belle Fourche, where the total salt content was relatively high, the chief substances found were lime, sulphates, and bicarbonates. No carbonates were found in the water from Huntley and Belle Fourche, and only very small quantities were present in the other samples. Bicarbonates were found at all the farms, and chlorine was present in small amounts in all the samples from each farm except Huntley. Sulphates were low at all places except Belle Fourche and Yuma. The number of pounds of salts in an acre-foot of water was lowest at Umatilla - 224 - and highest at Belle Fourche - 2424. This latter figure indicates a rather high content, but since most of the salts at Belle Fourche are sulphates there is little likelihood that serious difficulty will result from the use of the water.

Irrigation Water in Other Districts.

It is interesting to compare the figures given above with similar data obtained in other irrigated district. In order to facilitate this comparison the results of some analyses of water used in northern Utah and in the southwestern United States are given below.

Utah River Waters. - Bulletin 22, of the Utah Experiment Station, reports analyses of the waters of six rivers in Utah in 1892. The bulletin states that "a small sample was taken every week during the irrigation season, and these were united in a large sample which was subjected to complete analysis". Determinations were made of the total soluble salts, lime, magnesia, potash, chlorine, and nitrogen. The bulletin does not mention sulphates or carbonates. As the nitrogen present was negligible in all cases, it is not included in Table 8. The figures in the table have been recalculated from those in the Utah bulletin so as to be directly comparable with those given above.

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Quality of Irrigation Water (continued).

TABLE 8

River	<u>Salts in parts per 100,000</u>					Lbs. of salts per acre-ft. of water
	Total soluble	CaO	MgO	K ₂ O	Cl	
Logan	17.5	6.6	1.8	0.1	0.3	472
Bear	29.0	8.0	1.5	0.3	0.3	783
Provo	22.4	6.7	1.3	0.4	0.1	604
Weber	30.2	7.6	1.2	0.7	0.3	815
Jordan	40.1	7.6	2.7	0.3	1.9	1082
Ogden	27.5	7.2	1.8	0.3	0.4	742
Average	27.8	7.3	1.7	0.3	0.5	750

The table shows that the total salt content of the different rivers varied from 17.5 parts per 100,000 in the Logan to 40.1 parts per 100,000 in the Jordan, the average of the six rivers having been 27.8 parts per 100,000, or .0278 percent. It is obvious that the analyses as reported were incomplete, since the total of the substances reported does not nearly equal the total salt content. These rivers all flow into Great Salt Lake. The salt in the lake water is chiefly NaCl, and it contains considerable quantities of sulphates, so that on complete analyses, the river waters might be expected to be found rather high in soda and to contain some sulphates.

Comparing Table 8 with Table 7 it is seen that the water of the Utah rivers contained less salt on the average than the water at Yuma and Belle Fourche, but more than that at Truckee-Carson, Umatilla, Scottsbluff, or Huntley. The salt content

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Quality of Irrigation Water (continued).

of the water at Umatilla and at Huntley was less than that of any of the Utah river waters.

The water from all these Utah rivers has been used for irrigation for more than 50 years without damage to the soil where proper drainage conditions have existed. This being true, the statement that an acre-foot of a particular irrigation water contains 800 or 1000 pounds of salt becomes less impressive than it might otherwise appear. It is clear that the quality rather than the quantity of the salts is the point to be considered, and that proper drainage is a highly important factor in this connection.

River waters in the Southwest.- In Bulletin 83, of the New Mexico Experiment Station, analyses of water samples from fourteen rivers in New Mexico and adjacent states are reported. Determinations were made of the total salts, lime, magnesia, soda, carbonates, bicarbonates, sulphates, and chlorine. The bulletin is very vague in regard to when the samples were taken and to just what each analysis represents, so that in many cases the exact meaning of the figures is not at all clear. The data are given in Table 9.

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River waters in the Southwest (continued).

Table 9.— River Waters in the Southwest.

River.	Locality.	Salts in parts per 100,000.								pounds of salts per acre-foot of water.
		Total soluble	CaO	MgO	Na ₂ O	CO ₃	HCO ₃	SO ₄	Cl	
Animas	Durango, Colo.	32.4	9.9	1.9	3.3	0.1	15.0	9.1	2.3	874
Gallinas	Las Vegas, N. Mex.	20.4	5.7	0.9	3.9	0.2	15.0	2.0	2.2	550
Gila	San Carlos, Ariz.	73.6	11.3	3.6	20.2	0.2	26.0	7.3	22.0	1987
Hondo	Roswell, N. Mex.	78.2	20.9	4.9	5.2	0.3	15.0	29.1	3.9	2111
Pecos	Santa Rosa, N. Mex.	122.0	37.7	0.1	6.0	0.1	18.0	51.6	4.3	3294
Pecos	Santa Rosa, N. Mex.	311.0	61.5	16.5	50.9	0.2	17.0	100.0	62.0	8397
Pecos	Carlsbad, N. Mex.	373.0	53.1	15.7	40.4	0.1	16.0	100.0	46.0	7344
Rio Grande	San Marcial, N. Mex.	43.8	9.7	2.3	8.2	0.1	17.0	14.1	4.1	1182
Rio Grande	El Paso, Texas.	69.9	13.9	2.9	14.8	0.1	24.0	17.5	10.0	1887
San Francisco	Alma, N. Mex.	24.4	6.1	1.6	3.9	0.3	17.0	2.0	2.0	658
Sapello	Los Alamos, N. Mex.	26.9	8.6	1.8	3.5	0.2	19.0	4.9	1.3	726
Colorado	Yuma, Ariz.	70.7	12.8	3.8	14.8	0.6	23.0	15.0	13.0	1908
Grand	Kremmling, Colo.	12.4	3.6	0.1	2.1	0.1	8.9	2.1	0.9	334
Grand	Palisade, Colo.	41.0	8.6	2.8	8.9	0.1	16.0	7.8	8.2	1107
Gunnison	Whitewater, Colo.	50.3	10.6	3.9	6.8	0.1	19.0	17.5	2.4	1371
Little Colorado	Holbrook, Ariz.	84.5	....	...	...	0.1	27.1	....	18.7	2281
Little Colorado	Woodruff, Ariz.	57.1	9.5	2.8	14.8	0.1	20.0	14.1	9.7	1541
Salt	Roosevelt, Ariz.	53.4	8.2	2.9	14.8	0.2	19.0	4.3	16.0	1441
Verde	McDowell, Ariz.	36.6	8.2	3.9	5.9	0.6	26.0	5.5	3.4	928

28 February, 1914.

Quality of Irrigation Water (continued).

The total salt content of these waters varied all the way from 12.4 parts per 100,000, in the Grand River, at Kremmling, Colo., to 311 parts per 100,000, in the Pecos River, at Santa Rosa, N. Mex.. Comparing this table with Table 7, it is seen that many of the southwestern rivers carry more salt than is found in the irrigation waters at our farms. The Pecos is the only river carrying more salt than was found at Belle Fourche, but six southwestern rivers exceed in salt content the water used at Yuma where the salt content was next to that at Belle Fourche. It is seen that the Colorado, at Yuma, is reported as carrying 70.7 parts per 100,000, while the average obtained from our Yuma samples was only 46.6 parts per 100,000. One of our samples from Yuma, however, contained 87.8 parts. The difference between the average of our Yuma samples and the figure reported by the New Mexico bulletin may be due to differences in the time of sampling. The New Mexico bulletin is not clear as to when the sample containing 70.7 parts per 100,000 was taken, or whether it is an average of several samples.

In Bulletin 44, of the Arizona Experiment Station, Forbes calls attention to the wide seasonal fluctuations in the salt content of the Colorado river water caused by varying influences of tributary streams which flow irregularly and which drain watersheds containing different quantities of salts of various kinds. He reports the results of analyses of Colorado River water sampled at frequent intervals, during the year 1900. The highest salt content found during that year was 125 parts per 100,000, in October; and the lowest was 21 parts per 100,000, in June. In order to compare Forbes' results with those obtained from the samples taken at the Yuma farm, in 1913, Table 10 has been prepared.

28 February, 1914.

Quality of Irrigation Water (continued).

TABLE 10.

<u>Month</u>	<u>Number of samples</u>		<u>Salts in parts per 100,000</u>	
	<u>1900</u>	<u>1913</u>	<u>1900</u>	<u>1913</u>
May	6	1	37.1	24.4
June	4	1	24.5	20.6
July	4	1	27.7	30.1
August	5	1	48.8	50.8
September	5	1	72.6	87.8
October	5	1	113.6	66.0
Six months	29	6	55.4	46.6

The table shows a fair agreement between the two sets of analyses except in the October samples, which were nearly twice as high in total salts in 1900 as in 1913. Forbes states that "During the time of observation (a little more than one year, beginning January 10, 1900) the Colorado River for only 50 days contained more than 100 parts of salts in 100,000, and during 330 days, less." It seems likely that, for the season of the year represented by the 1913 samples, the figures obtained from those samples are fairly representative; but it must be remembered that the water of the Colorado is subject to very wide fluctuations.

Eleven of the fourteen southwestern rivers carried a higher percentage of salt than was found at Scottsbluff, Huntley, Umatilla or Truckee-Carson. They all carried more than was found at Umatilla, and all but one, the Grand, at Kremmling, Colo., carried more than was found at Huntley. Lime, magnesia, soda, bicarbonates, and sulphates were the chief substances found. The Pecos River, at Santa Rosa, and at Carlsbad, was unusually high in chlorine. Carbonates were found in the waters from all the rivers, but in very small quantities in all instances - never more than about 0.6 part per 100,000, or .0006 percent.

The waters of most of these rivers are used in irrigation. As a general rule it is found safe to use them, provided the soil is well drained. Drainage is particularly necessary where water from the Pecos is used for irrigation. This water, as shown in Table 9,

28 February, 1914.

Quality of Irrigation Water (continued).

contains from 3000 to 8000 pounds of salt per acre-foot. On the Carlsbad Project, where this water is used, the soil is sandy so that it drains readily. Mr. L. E. Foster, the Project Manager, is quoted in the New Mexico Bulletin as saying "Where drainage is good and ordinary care is used in cultivation, I have never noticed any bad effects from the use of the ordinary irrigating waters on this project." In addition to the matter of drainage, it is important to consider that while many of these waters are high in lime and sulphate, all of them are relatively low in carbonates.

F. D. F.

The "Hogging" Experiments of 1913.
(A Correction).

In the Weekly Bulletin for February 21, 1914, Vol. V, page 58, there is an error in the table, which should be corrected. In the column headed "Total gain per day, Lbs." on the line of Lot 3, under Belle Fourche, the figures "1.5" should be changed to "4.8".

C. S. S.

PLANT IMPORTATIONS.

The following circular letter has been received from the Office of Foreign Seed and Plant Introduction:

"For the use of this office in handling incoming shipments, we should be obliged if you would furnish us a list of the principal genera in which your office is particularly interested. We propose to use a card, like sample enclosed, to advise the different offices of the arrival of material of possible interest to them, and such a list as is requested would aid us very materially".

The desired information should be sent in to this office by the various field stations operated by this office, to be assembled and transmitted to the Office of Foreign Seed and Plant Introduction.

7 March, 1914.

FIELD NOTES.

Yuma.

During the week ending February 14, the maximum temperature was 83, minimum temperature 27, and greatest daily range 49.

Borders A 1-3 and 4 were disced and leveled for alfalfa planting. Borders D-20 to 24 were disced and dragged, and D-16 was replowed and planted to potato varieties on February 10.

A quantity of nuts from a few excellent seedling pecans from south Texas was secured and the whole of the recently leveled strip of land in the northwest corner of the farm, Field F, was seeded to a pecan nursery. If a successful germination is secured there should be sufficient plants produced here for testing seedling trees, budding to paper shell varieties and for some local distribution.

Date nurseries and general nursery plantings on A-14 were cultivated and hoed, also garden on A 12-2.

Several loads of wood were cut, hauled and sawed for farm use. Considerable work has been done on roads, ditches, orchards and field borders in hoeing out sour clover (Melilotus indica), and mallow weeds (Malva parviflora), and Sida luderacea. All of these weeds are very obnoxious, especially in alfalfa fields producing seed; they are becoming very generally distributed over the Valley, and are among those being quarantined against in alfalfa seed importations.

Truckee-Carson.

During the week ending February 21, the maximum temperature was 58, minimum temperature 23, and precipitation .34 inch.

The work of laying 10-inch tile in the "Y" drain was resumed. Plats F-22 to 26 were plowed. Two men and six horses were employed throughout the week in leveling the "Y" series. To date distribution of trees

7 March, 1914.

FIELD NOTES.

Truckee-Carson (continued).

and shrubs have been made as follows: Carolina Poplar, 71; Chinese Poplar, 21; American Elm, 8; Karamash Elm, 16; Chinese Willow, 22; Babylonian Weeping Willow, 2; Russian Oleaster, 29; Tamarix indica, 10; Tamarix africana, 14; Tamarix gallica, 2; Native Tamarisk, 200 cuttings; Apples, 6.

San Antonio.

During the week ending February 28, the maximum temperature was 76.5, minimum temperature 23, and precipitation .14 inch. The unusually cold weather during the early part of the week has injured the fruit crop rather severely as many of the early peach varieties were either in full bloom or past bloom; the cold did very little damage, however, except to the peaches.

Owing to the unfavorable weather conditions the greater part of the week little field work was possible.

Mr. E. B. Brown arrived at the Station on the 27th, and Mr. W. E. Townsend left for the East on the 25th.

During the week ending February 21, the maximum temperature was 80.5, minimum temperature 32, and greatest daily range 45. The total rainfall for the week was .26 inch.

The field peas planted on the rotation plats for green manure were killed to the ground by the freeze occurring January 31, when the temperature went down to 22. The vines had made considerable growth and were in flower at the time so that the cold occurred at the worst possible time. This is the first time since this variety has been grown that it has been severely injured by cold, even when much severer temperatures have been experienced. The same variety which was planted for seed on B3, but much later than in the rotation plats, was not injured at all.

Four small areas of 3.5 x 3.5 feet from each plat were taken, and from the weights obtained the follow-

7 March, 1914.

FIELD NOTES.

San Antonio (continued).

ing yields were estimated:

A4-16.....	1834	lbs. per acre.
A4-19.....	1222	" " "
B4-17.....	1500	" " "
B6-7	3000	" " "
B6-9	2611	" " "

The yields represent air dried vines. During the week the above plats were plowed.

Corn was planted in the rotation plats February 21.

Several seedling plums that Mr. Schattenberg, of Boerne, grew were root grafted on Spanish peach seedlings in the nursery.

Several of the farm demonstrators of southwestern Texas visited the station on February 20.

Blackleg Vaccine furnished by Bureau of Animal Industry.

Mr. Aune recently transmitted a request from a farmer on the Belle Fourche Project for some blackleg vaccine with which to treat 40 head of yearling cattle. The matter was taken up with the Bureau of Animal Industry, and the Chief Clerk of that Bureau stated that blackleg vaccine will be furnished free to farmers upon request. Correspondence should be addressed to the Bureau of Animal Industry, and state the age and number of animals to be vaccinated. It was stated that hog cholera vaccine is not furnished by the Bureau.

Water Supply, Plumbing, and Sewage Disposal for Country Homes.

Under the above title the Office of Experiment Station published (Dept. Bull. 57) a paper on the subject of farm home sanitation relating to pure water supplies, the safeguarding of the same against contamination, and the safe disposal

7 March, 1914.

Water Supply, Plumbing, and Sewage Disposal (continued).

of sewage. It is believed that this bulletin will be of interest to our farm superintendents and copies are being sent them.

Miscellaneous Water Analyses in 1913.

In connection with the samples of irrigation water collected at the field stations in 1913, and reported on in the Weekly Bulletin for February 28, some of the field men sent in special water samples to be analysed. Mr. J. F. Brezeale, of the Bureau of Chemistry, did the analytical work, and the results are reported below:

Yuma.

On November 3, Mr. Blair took a sample of water from the open drain at the south side of the experiment farm; and on November 12, he took a sample from the well near the office. Mr. Blair states that it is occasionally necessary to use the water from this well for propagating purposes. The results of the analyses of these two samples are given below, in parts per 100,000. The last column in the table gives the average results of the analyses of the irrigation water samples taken in 1913 and reported on last week.

	Well Water, Nov. 12.	Drainage Water, Nov. 3.	Average of Irrigation Water Samples.
Total Salts	58.7	57.6	46.6
CaO	12.2	13.8	11.2
MgO	4.2	4.2	3.7
K ₂ O	1.1	0.9	0.8
Na ₂ O	14.5	13.1	9.7
CO ₃	0.0	0.0	0.3
HCO ₃	25.2	27.0	19.1
Cl	10.5	15.4	6.9
SO ₄	20.9	10.9	18.3
NO ₃	0.0	0.0	----

7 March, 1914.

Miscellaneous Water Analyses in 1913 (continued).

It is seen that the two special samples did not differ materially in total salt content or in the quantities of the different substances found, and that carbonates and nitrates were absent from both samples. It is of interest to note that while the drainage water contained more total salts than the average of the irrigation water samples, it contained less salt than two of the irrigation water samples taken during the season. The sample taken September 17 contained 87.8 parts per 100,000, and that taken October 28, six days before the drainage water was sampled, contained 66 parts per 100,000. It should be remembered, however, that only one sample of the drainage water was secured. The irrigation water averaged somewhat lower in Na₂O and Cl than either the well water or drainage water, but the differences were slight.

Scottsbluff.

On October 15, 1913, Mr. Knorr took a sample of water from the drainage ditch, about one mile east of Mitchell. The results of the analysis of this sample are given below, together with the average results obtained from the six samples of irrigation water reported on last week. The figures indicate parts per 100,000.

Drainage Water	Average of Irrigation Water Samples.
Total Salts	34.0
CaO	7.2
MgO	2.3
K ₂ O	1.1
Na ₂ O	8.5
CO ₃	3.0
HCO ₃	19.8
Cl	2.1
SO ₄	7.3
NO ₃	0.5
	1
	25.6
	8.0
	1.7
	1.2
	4.3
	0
	16.7
	1.7
	7.5
	0.7

7 March, 1914.

Miscellaneous Water Analyses in 1913 (continued)

The drainage water contained more salts than the average of the six samples; but one of these samples contained 35.8 parts per 100,000, slightly more than the drainage water. The sample of drainage water contained 3 parts per 100,000 of carbonates, while these were absent from all the samples of irrigation water except the one taken September 1, which contained 0.5 parts per 100,000. All things considered, the drainage water, according to the analysis of the single samples, was rather strikingly similar to the irrigation water.

Belle Fourche.

Late in the fall of 1913, Mr. Aune took a sample of water from a well 10 feet deep which was dug last year near Deadman Creek, at the east side of the experiment farm. This water was used for drinking purposes during the fall of 1913 without any apparent ill effects. The results of the analysis of this sample are given below in comparison with the average results obtained from the four samples of irrigation water, the figures indicating parts per 100,000.

	Well Water	Average of Irrigation Water
Total Salts	619	89.8
CaO	76.1	24.5
MgO	62.5	7.2
K ₂ O	2.4	0.7
Na ₂ O	119	6.6
CO ₃	0	0
HCO ₃	26	19.2
Cl	45.5	T
SO ₄	385	56.8
NO ₃	0	0

7 March, 1914.

Miscellaneous Water Analyses in 1913 (continued).

The well water sample is shown to have been extremely high in salt content - 619 parts per 100,000, or 0.62 percent. It contained almost seven times as much salt as the average of the irrigation water. Mr. Brezeale calculated that the following quantities of the specified salts were present:

CaSO ₄ , gypsum.....	8.75	grams per gallon.
Na ₂ SO ₄ , Glauber's salts.....	15.39	" " "
MgSO ₄ , Epsom salts.....	14.56	" " "
NaCl, Common salt.....	2.87	" " "

These quantities are so large that it is suspected that the sample was not fairly representative of the water, since the latter had been used for drinking purposes without any undesirable effects. Several more samples will be secured and analysed in 1914.

Dairying on the Truckee-Carson Project.

Under date of February 24, Mr. Headley wrote as follows:

"The dairy situation here is very interesting. Mr. Heisey has shipped in about 500 dairy cows and the farmers are clamoring for more. Lister Wheeler bought 30 head last week for \$3,100. The demand for cows has been strengthened because it has been almost impossible to market hay this season.

The Cost of a 100-pound Pig.

The following quotation is taken from "Wallaces Farmer", for February 13, 1914.

"An exact estimate is of course impossible, for conditions and prices vary greatly from year to year and in different parts of the country. Under average corn belt conditions, with feed prices as they are at present, we would expect the average pig to cost at birth about \$2.25. This includes all the costs of feed, boar service, interest on money invested in sows,

7 March, 1914.

The Cost of a 100-pound Pig (continued).

buildings, feed, etc., depreciation of buildings, chance of loss, and miscellaneous items. The litter is assumed to average six pigs. With smaller litters than this, the birth cost per pig would be much greater, and in large litters it would be correspondingly less. More than any other one factor, the size of litter determines the cost of the pig at birth. The cost of raising a pig from farrowing to weaning varies with the season of year. If the sow may run on pasture, less grain feed is of course necessary. At present prices it will probably take about \$2.50 to cover the cost of feed, pasture, and possibility of loss up to the time the pigs are weaned, thus making the total cost of a 50-pound pig about \$4.75.

If the 50-pound pig were put on good clover, alfalfa, or rape pasture, and fed a mixture of ten to twenty parts of corn to one of tankage, it would probably cost \$2.35 or \$2.50 to increase his weight from 50 to 100 pounds. All items included, we would expect the price of a 100-pound pig under average corn belt conditions at present prices to be a little over \$7. We would be glad to hear from any of our readers who desire to modify this statement in any way".

Note. According to the last paragraph of the above it would cost 4.5¢ to 5.0¢ per pound for the gain made by the hogs on pasture. As a comparison with this it seems fair to estimate the cost of the gains made by the hogs in Lots 2 and 3 at Scottsbluff in 1913. The hogs in these lots weighed about 34 pounds at the beginning and about 90 pounds at the end of less than 70 days, these pigs made 548 pounds of gain on the quarter-acre plat. They were fed \$11.34 worth of corn, at 60¢ per bushel. If we allow \$5.00 per acre as a fair rental for the alfalfa land for that period, \$1.25 per plat, the total cost of the gain becomes \$12.60, which is at the rate of 2.3¢ per pound, or about half that estimated in the above statement.

C. S. S.

7 March, 1914.

Controlling Alfalfa Weevil.

The following quotation is from an article by Dr. E. G. Titus, of the Utah Experiment Station, appearing in the "Utah Farmer", for February 14. Dr. Titus has had charge of Utah's campaign against the alfalfa weevil since August, 1908, and the following statements summarize his conclusions as to the most practical methods of control.

"The weevil rarely causes serious injury to the crop until it has been in a section three years. While portions of the counties mentioned have had the weevil two years, in other sections it has been present but one year and has not yet reached some parts of the above counties.

There is no known means of preventing the spread of the weevil which is mainly by flying. The spring flight lasts two or three weeks and there is a summer flight of about the same duration. During these periods the weevil may become distributed 15 or 20 miles into new territory.

During the early fall, late winter, and early spring, it will be advisable to clean up the neglected fence rows, ditch banks, and other places where trash and weeds have gathered. A thorough discing or spring toothing before the first crop starts will aid materially in promoting a more rapid and better growth of the alfalfa. Every day gained at this time is of permanent value to all the cuttings which follow, since it will allow the first crop to be removed that much earlier. The weevil begin their work early and ruin quite a number of small shoots; later they lay their eggs in the stalks, these hatch, and the young worms begin damaging the crop by feeding upon the buds and leaves. The earlier the crop can be brought to maturity, the less the damage. Remove the first crop from the ground as soon as possible after cutting, and then thoroughly stir up the field with a spring tooth harrow followed by a brush drag. In making the brush drag be sure that there is sufficient brush, and that it is closely enough laid to thoroughly pulverize the loosened soil. Usually the worse the field looks when you are through the better job you have done. Practically all of the leaves should have been removed from the stubble and a fine dust mulch distributed over the field. Hot sunshine will kill the larva

7 March, 1914.

Controlling Alfalfa Weevil (continued).

of the alfalfa weevil in a very short time. A few hours of hot, sun-shiny weather for a couple of days should be allowed before the field is irrigated.

Then when fall comes "clean up" in and around the fields. Even where the weevil has not yet appeared the treatment between the first and second crop will prove to be a paying investment since it means a decidedly better return from the second cutting hay crop.

There is no appreciable damage to the second and third crops by the weevil, when proper cultural methods of control have been used. Where no effort has been made to control the weevil the second crop will often fail to start for several weeks. This may mean an entire failure to secure a third crop.

Alfalfa over 5 to 7 years old should be plowed up and some other crop raised instead. Old fields of alfalfa are much more severely injured than fields 3 to 7 years old.

CLEAN CULTURE, CAREFUL CULTIVATION, and CROP ROTATION are the essential features in the control of the alfalfa weevil".

14 March, 1914.

FIELD NOTES.

Truckee-Carson

During the week ending February 28, the maximum temperature was 58, minimum temperature 20, and precipitation .08 inch.

The leveling of Field Y and the construction of the Y drain was continued. Twenty-four tons of manure were applied to Y6.

A law recently passed by the legislature of California, and which is now being enforced, prohibits the importation of hay or other farm produce carrying seeds or plants of Russian thistles. The result is that a large part of the alfalfa hay raised on the Truckee-Carson Project is not now acceptable on the California market.

Mr. Headley made a trip to Reno, Nevada, on February 27, for the purpose of perfecting plans with the State Experiment Station for a cooperative grain variety test to be conducted at Fallon, under the supervision of the Truckee-Carson Experiment Farm. Several varieties each of wheat, oats, and barley will be furnished by the State Station.

A local paper announces that during the ten days preceding February 25 the Churchill County Creamery imported 600 head of dairy and stock cattle to the Truckee-Carson Project. The local creamery is now buying about \$5,000 worth of milk and cream per month.

Scottsbluff

During the week ending March 7, the temperature was very changeable, the maximum temperature being 60, and the minimum temperature 15. On the day the temperature dropped to 15 a very fine snow began to fall, but by night the wind went down and the storm abated. The weather was somewhat blustery through the week. Two days of high wind drifted considerable soil, but no damage was done. Taken as a whole, there does not seem to be as much drifted

14 March, 1914.

FIELD NOTES.

Scottsbluff (continued).

soil this spring as was found last year at the same time.

The mangers were taken out of the barn and 3" x 4" pieces were substituted in place of the 12" boards, leaving a two-inch space between the timbers. All of the dust and fine stuff is sifted out of the hay, and seems to be better for the horses. The sides of the hay chutes were also torn out. The animals can now get to the hay without having to dig into the hay chutes and get their nostrils filled with dust and fine leaves. The horses appear to be doing better with the new arrangement.

The walls of the mess dining room and kitchen are being painted.

Mr. Knorr reports that many of the farmers on the North Platte Project are renting their farms this year. The rent paid is from \$6.00 to \$7.00 per acre. Several farms have been rented on a term of years, with the proviso that if the Sugar Factory will not run in 1914, new terms must be made.

The past two weeks the price of hay has gone down. Some hay on the adjoining farms has been sold to cattle feeders for \$2.50 and \$2.00 per ton.

Present indications are that the sheep feeders will do very well this year. The prices have been good all winter, and though the rush is now on to get the lambs to market there has been no break in the prices.

SALTS IN THE GROUND WATER ON THE WORDEN TRACT.

In connection with the experiments on the Worden tract, near the Huntley Experiment Farm, four wells were made on the tract in 1913 for the purpose of determining the depth to ground water and the quantity and nature of the salts found in the water. The locations of the four wells and the relative elevation of the ground at each well are indicated in the diagram below, in which the elevation of the ground

14 March, 1914.

Salts in Ground Water on Worden Tract (continued).

at Well B2 is taken as Zero.

Well Al	FIELD MI	Well Bl
* (Elev. 1.39 ft.)		*
	(Elev. 0.71 ft.)	
	900 ft.	
* (Elev. 1.12 ft.)	(Elev. 0.0 ft.) *	
Well A2		Well B2

Nine samples of water were secured from each well during the season. These samples have been analysed by Mr. Breazeale, and the results are given in detail in Tables 1 to 4.

TABLE 1.

Date	Depth Ground Water, ft.	Salts in parts per 100,000							
		Total	Soluble	CaO	MgO	Na ₂ O	CO ₃	HCO ₃	Cl	SO_{4}
June 8	3.29	1123	43.4	59.2	361	0	24.0	12.6	759
July 14	3.16	1275	47.2	65.4	409	0	18.0	14.0	856
Aug. 2	5.13	1415	54.0	77.3	454	0	19.2	14.0	985
Aug. 17	2.98	1423	62.6	73.8	441	0	50.4	15.3	982
Sept. 2	3.06	1469	59.8	79.8	453	0	12.0	14.0	1025
Oct. 2	1.52	1400	56.6	76.5	436	0	24.0	12.6	979
Oct. 17	1.83	1479	59.6	80.2	451	0	27.6	14.0	1021
Nov. 1	1.80	1442	56.8	77.8	472	0	42.2	14.0	996
Nov. 15	2.02	1424	54.4	77.7	461	0	31.8	12.6	992
Average	2.53	1383	54.9	71.96	437	0	27.69	13.66	952

Well Al. As shown in Table 1, the water from Well Al contained an average of 1383 parts per 100,000 of total salts, the salt content having varied from 1123 parts on June 8, to 1479 parts on October 17. The chief substances found were sulphates, soda, magnesia, and lime. Bicarbonates and chlorine were found in all the samples, but no carbonates were present in any of them. The total salt content and the quanti-

14 March, 1914.

Salts in Ground Water on Worden Tract (continued).

ties of the different substances present were fairly constant throughout the season.

The water table rose and fell irregularly, the highest point reached having been 1.52 feet from the surface, on October 2, the lowest, 3.29 feet, on June 8, and the average for the period, 2.53 feet. There does not appear to have been any direct relation between the elevation of the water table and the salt content of the water. The salt content did not change consistently as the season advanced, but it was lowest during June and July.

TABLE 2: Well A2.

Date	Depth to Ground Water, ft.	Salts in parts per 100,000						
		Total Soluble	CaO	MgO	Na ₂ O	CO ₃	HCO ₃	Cl
June 11	3.56	2799	63.2	132.4	908	0	34.8	37.8
July 14	3.44	2685	62.0	120.4	937	0	27.6	32.2
Aug. 2	3.38	2857	57.0	79.3	1062	0	9.0	28.7
Aug. 17	2.96	2774	67.2	131.9	1142	0	37.8	28.0
Sept. 2	3.31	2863	66.0	133.2	981	0	39.0	28.0
Oct. 2	1.94	2760	66.2	129.7	882	0	46.8	28.0
Oct. 17	2.17	2971	66.3	149.0	1095	0	48.0	29.3
Nov. 1	2.15	2954	61.2	149.6	1000	0	46.8	28.0
Nov. 15	2.35	2799	64.6	135.4	1002	0	52.8	24.5
Average	2.81	2829	63.73	128.99	1001	0	38.07	29.38
								1901

Well A2. Table 2 shows that the water from Well A2 contained an average of 2829 parts per 100,000, the greatest concentration found having been 2971 parts, on October 17, and the lowest, 2685 parts, on July 14. The chief substances found were sulphates, soda, magnesia, and lime. No carbonates were found. Bicarbonates and chlorine were present in all the samples. The total salt content and the quantities of most of the different substances found were fairly constant, except in the case of bicarbonates, which were markedly low on August 2. No consistent relation was noted between the

14 March, 1914.

Salts in Ground Water on Worden Tract (continued).

salt content and the elevation of the water table or the time of sampling.

TABLE 3: Well Bl.

Date	Depth to Ground Water, ft.	Salts in parts per 100,000							
		Total Soluble	CaO	MgO	Na ₂ O	CO ₃	HCO ₃	Cl	SO ₄
June 8	3.47	1183	2.0	5.1	517	8.7	30.0	11.2	792
July 14	3.51	1388	18.4	38.1	540	1.1	15.2	10.5	943
Aug. 2	3.38	1565	14.0	55.1	579	1.1	14.4	11.9	1069
Aug. 17	3.46	1647	30.8	67.4	574	0	31.2	14.0	1110
Sept. 2	3.49	1656	24.0	66.6	592	0	19.2	9.9	1143
Oct. 2	2.26	1487	12.8	50.8	567	4.6	9.0	11.9	1012
Oct. 17	2.51	1578	21.2	60.7	594	3.5	7.8	10.5	1082
Nov. 1	2.61	1520	18.4	61.9	557	2.3	15.6	8.2	1048
Nov. 15	2.73	1589	19.0	63.0	572	2.3	12.0	10.5	1059
Average	3.05	1512	17.84	52.08	566	2.62	16.93	10.95	1028

Well Bl. The water from Well Bl., as is shown in Table 3, contained an average of 1512 parts per 100,000 of total salts. The lowest concentration was 1183 parts per 100,000, on June 8, and the highest, 1656 parts, on September 2. As in the case of Wells A1 and A2, the chief substances found in the water were sulphates, soda, magnesia, and lime. Carbonates were found in seven of the nine samples, the average carbonate content having been 2.62 parts per 100,000. Bicarbonates and chlorine were found in all the samples. The total salt content was fairly constant, but the quantities of the different substances present varied considerably. No consistent relation was found between the elevation of the ground water and the salt content. The salt content was low-

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Salts in Ground Water on Worden Tract (continued)

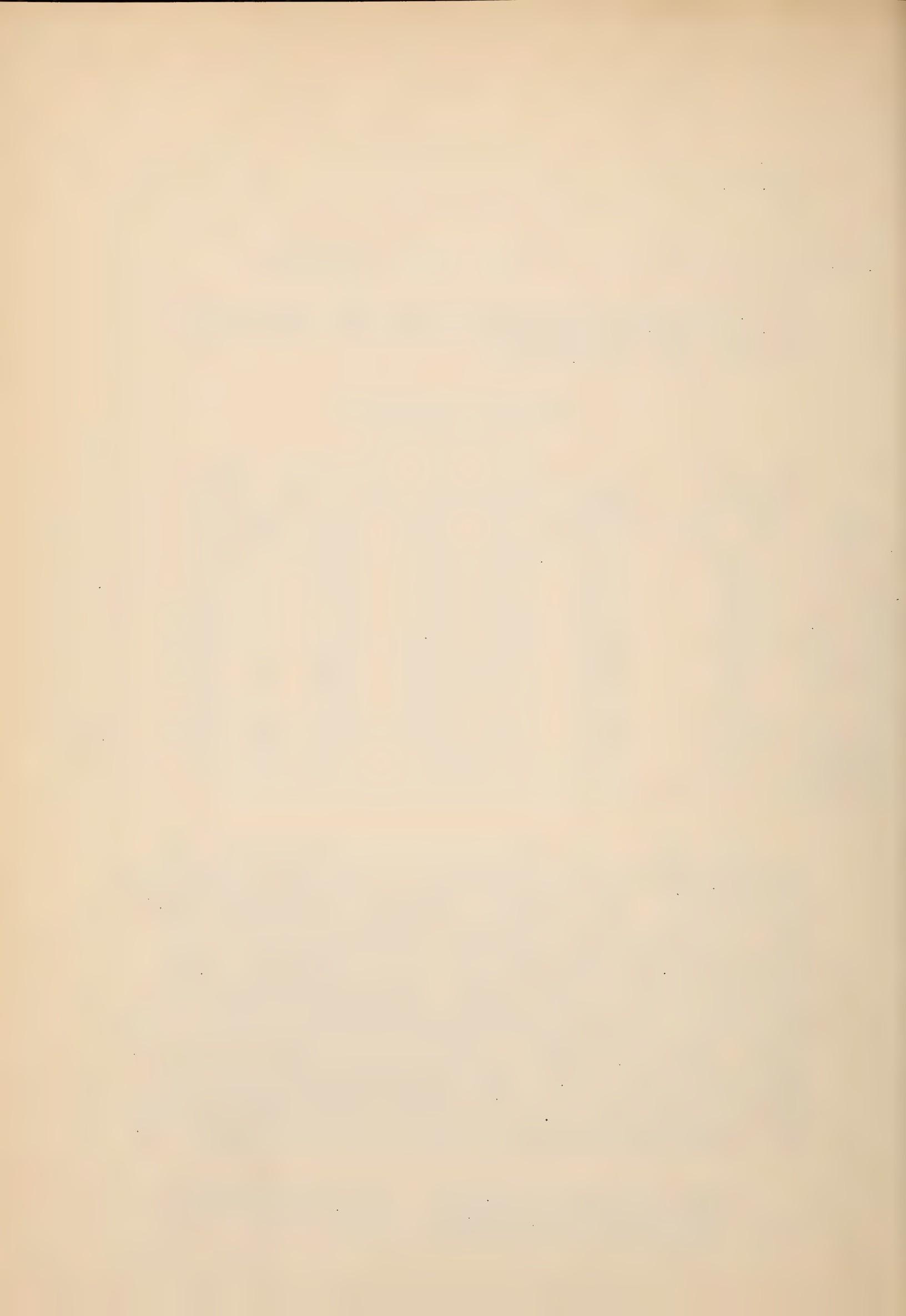
est in June and July, but, aside from this, no consistent relation appeared between the salt content and the time of sampling.

TABLE 4: Well B2.

Date	Depth to Ground Water, ft.	Salts in parts per 100,000						
		Total Soluble	CaO	MgO	Na ₂ O	CO ₃	HCO ₃	Cl
June 11	3.52	1215	12.8	33.4	493	2.3	24.0	21.7
July 14	3.49	1065	5.6	14.7	452	2.9	12.0	10.5
Aug. 2	3.28	1130	26.0	24.1	430	0	50.4	11.2
Aug. 17	3.32	1141	21.8	27.3	233	0	46.8	9.8
Sept. 2	3.32	1211	19.6	29.6	470	0	36.0	7.0
Oct. 2	2.38	1101	19.0	27.6	418	0	45.6	7.0
Oct. 17	2.77	1221	21.4	32.3	465	0	43.2	7.0
Nov. 1	2.62	1175	22.4	29.5	454	0	36.0	7.0
Nov. 15	2.68	1226	25.2	32.9	468	3.5	39.0	7.0
Average	3.04	1165	19.31	26.82	431	.97	37.0	9.8
								788

Well B2. The total salt content of the water from Well B2, as shown in Table 4, averaged 1165 parts per 100,000. The highest concentration - 1226 parts per 100,000 - was found in November 15, and the lowest - 1065 parts per 100,000 - was found on July 14. Sulphates and soda were the chief substances found, and the next, in order, were bicarbonates, magnesia, and lime. Carbonates were present in three of the nine samples, and chlorine was present in all the samples. The total salt content varied but little, but the quantities of the different substances present varied considerably. The total salt content did not vary consistently with the time of sampling, nor with the fluctuations in the elevation of the ground water.

Comparison of Four Wells. In order to facilitate comparisons of the salt content of the water



14 March, 1914.

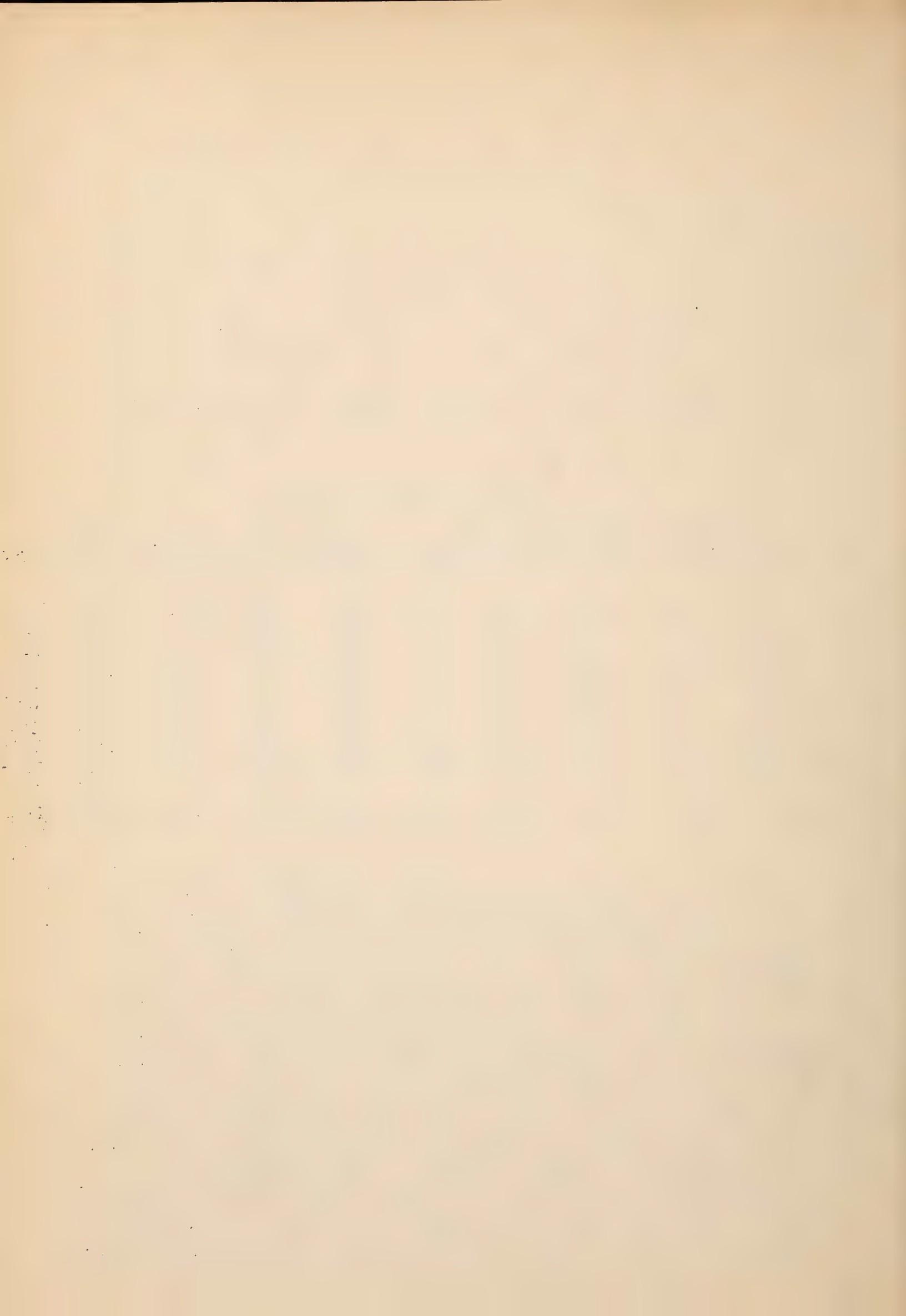
Salts in Ground Water of Worden Tract (continued)

from the four wells discussed above, Table 5 has been prepared:

TABLE 5: Four Wells.

Date	Depth to Ground Water, feet					Total Salts in Parts per 100,000					
	Well A1	Well A2	Well B1	Well B2	Aver.	Well A1	Well A2	Well B1	Well B2	Aver.	
June 8	3.29	3.56	3.47	3.52	3.46	1122	2799	1183	1215	1580	
July 14	3.16	3.44	3.51	3.49	3.40	1275	2685	1388	1065	1603	
Aug. 2	3.13	3.38	3.38	3.28	3.29	1415	2857	1565	1130	1742	
Aug. 17	2.98	2.96	3.46	3.32	3.18	1423	2774	1647	1141	1746	
Sept. 2	3.06	3.31	3.49	3.32	3.29	1469	2863	1656	1211	1800	
Oct. 2	1.52	1.94	2.26	2.38	2.02	1400	2760	1487	1101	1687	
Oct. 17	1.83	2.17	2.51	2.77	2.32	1479	2971	1578	1221	1812	
Nov. 1	1.80	2.15	2.61	2.62	2.29	1442	2954	1520	1175	1773	
Nov. 15	2.02	2.35	2.73	2.68	2.44	1424	2799	1589	1226	1759	
Average	2.53	2.81	3.05	3.04	2.86	1383	2829	1512	1165	1722	

Table 5 shows that the depth to ground water in the four wells averaged 2.86 feet during the period when water samples were taken. The water table averaged highest in Well A1 (2.53 feet), and lowest in Well B1 (3.05 feet). The salt content of the water from the four wells averaged 1722 parts per 100,000, or 1.722 percent. It was highest in the water from Well A2, which contained 2829 parts per 100,000, and lowest in the water from Well B2, which contained 1165 parts per 100,000. The water from Well A2 contained approximately twice as much salt as that from any of the other wells, and this ratio was practically constant in all the samples. The salt content of the water from the four wells averaged lowest in June and July, but the lowest concentrations were not found in all the individual wells at that time. There appears to be little if any relation between the salt content of the water and the elevation of the water table, or the time of sampling.



14 March, 1914.

Salts in Ground Water on Worden Tract (continued).

In 1914, determinations will be made of the salts in the soil near each well, to see to what extent the salt content of the ground water is influenced by the salt content of the soil immediately above.

F. D. F.

COOPERATIVE SOIL MOISTURE EXPFRIMENT.

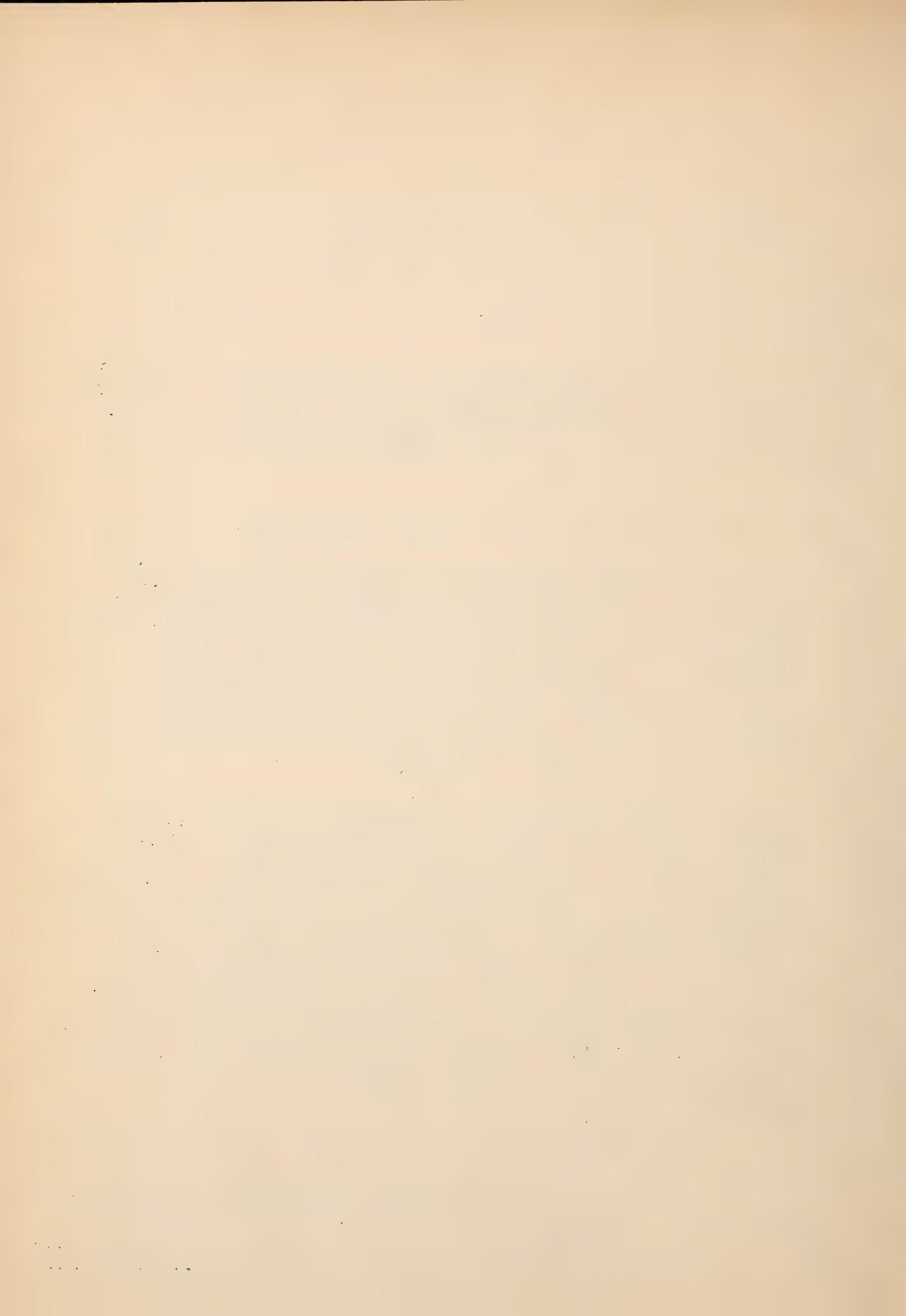
In endeavoring to study certain features of the behavior of soil moisture in the dry land rotations in the Great Plains some difficulty has been encountered because of the frequent impossibility of obtaining complete saturation of the soil at the beginning of the season. It has been suggested that this difficulty might be overcome by the use of irrigation water to saturate the soil, and with this in view the following memorandum has been prepared and has been approved by Mr. Chilcott and Mr. Scofield:

With the development of the soil moisture work as it has been conducted by the Office of Dry Land Agriculture in the Great Plains Area, certain problems have arisen which are difficult to solve under dry land conditions. Normal climatic conditions are seldom such that the soil is saturated to a depth below which it is thought plants feed. It has therefore been proposed to start cooperative work between the Office of Dry Land Agriculture and the Office of Western Irrigation Agriculture in the spring of 1914 at Scottsbluff, Huntley, and Belle Fourche. The work will be under the direct supervision of the assistant in Dry Land Agriculture at each field station. The purposes and plans of the experiments are outlined below:

Objects.

To determine

- (1) The maximum moisture holding capacity of the soil.
- (2) The quantity of soil moisture lost, after complete saturation, from bare uncultivated fallow.
- (3) The quantity of soil moisture lost, after complete saturation, from bare cultivated fallow.



14 March, 1914.

Cooperative Soil Moisture Experiment (continued)

- (4) To what depth the different crops are capable of utilizing soil moisture.
- (5) The minimum point of possible exhaustion.

Land.

Nine one-twentieth acre plats, separated by 5-foot alleys, will be required in this experiment. They should be in a solid block and so situated as not to be in danger of accidental flooding from irrigation water or from sub-irrigation from other plats, or from ditches. The block should be practically level to insure complete saturation of the entire area.

Methods.

(1) Irrigation.

(a) Object: To provide complete saturation of the soil, to as great a depth as it is likely any of the crops will feed, and to insure as nearly as possible equilibrium in distribution of water in the soil.

(b) Time: For the purposes of securing equilibrium, late fall irrigation is desirable, but in order to counteract the effect of evaporation from the soil near the surface during dry winters, a light irrigation may be necessary in the spring. For the season of 1914, spring irrigation will have to suffice, the water to be applied as early as possible after the land is plowed.

(c) Method: The land used should be surrounded by a dike high enough to confine the water which is applied. The water should be turned on to the land and allowed to flood the entire area. The flooding should continue as long as the soil continues to take water. Then the dikes should be broken and the superfluous water allowed to run off.

14 March, 1914.

Cooperative Soil Moisture Experiment (continued).

Methods (continued).

(2) Land Treatment.

Land should be well plowed in the fall, the irrigation water being applied shortly after plowing. In 1914 the land should be plowed just before irrigation. As soon as the soil is sufficiently dry, after spring irrigation, the land should be prepared for seeding. Up to this time all plats, including those left bare, should be given uniform treatment. From this time on the bare plats will be treated as follows: one plat kept well mulched throughout the season; the other kept free from weeds by shallow hoeing when necessary.

Crops Grown.

The following crops will be planted, each being seeded at the ordinary seeding time for each crop: wheat, oats, corn, potatoes, sugar beets, flax, and alfalfa. The same varieties of wheat, oats, corn, flax, and alfalfa will be planted as are used in the dry land rotations, at the same station. The same varieties of potatoes and sugar beets will be used as are used in the irrigated rotations at the same station. The wheat will be seeded at the rate of 5 pecks per acre; oats, 8 pecks per acre; corn, in rows 42 inches apart and plants thinned to 9 inches apart in the row; potatoes will be planted in rows 36 inches apart with sets 1 ft. apart in the row; alfalfa will be planted with a drill at the rate of 20 lbs. per acre; beets planted in 20-inch rows and thinned to 8 inches in the row; flax will be seeded with a drill at the rate of 30 lbs. per acre.

The plats should be arranged in the following order: (1) Bare, uncultivated; (2) bare, cultivated; (3) potatoes; (4) wheat; (5) corn; (6) oats; (7) beets; (8) flax; (9) alfalfa.

After planting, no treatment will be given to wheat, flax, oats, or alfalfa. Sugar beets, potatoes, and corn will be cared for the same as on the moisture conservation plats where inter-tilled crops are grown in the dry land rotations.

14 March, 1914.

Cooperative Soil Moisture Experiment (continued).

Soil Sampling.

A. Samples of each separate foot to a depth below that to which plants will feed should be taken on plats growing crops at the periods stated below. The depth necessary to take samples will vary with the character of the soil at the different stations, and will likely be from 6 to 10 feet.

- (1) At the time of seeding.
- (2) When the crop is coming up.
- (3) At the time the grain crops begin to shoot. (Beets, potatoes, flax, and corn at approximately the same time).
- (4) When the crops first shows signs of suffering from drought.
- (5) When the crop wilts permanently from drought.
- (6) Three days after No. 5 (as a check).

Should there be sufficient moisture in the soil to bring the crop to normal maturity, one set of samples should be taken two weeks before harvest, one set one week before harvest, and one set at harvest.

Notes should be taken as to the condition of the crop at the time each set of samples are taken.

Samples should be taken on the bare plats, to the same depth as on the cropped plats, as follows:

- (1) At early seeding time.
- (2) A week after seeding time.
- (3) About September 15th.
- (4) A week after No. 3.

Samples to a depth of 2 ft. should be taken on the bare plats every week. In these the first and second six inches should be sampled separately.

The man in charge of this work will likely need to modify the time and methods of sampling to suit local soil and climatic conditions, but he will follow the above outline as closely as possible.

21 March, 1914.

PASTURE EXPERIMENT AT GOODING, IDAHO.

The following quotation from "Hoard's Dairyman" for February 13 summarizes the results secured in 1913 in one of the Gooding pastures referred to in the WEEKLY BULLETIN of August 9, 1913:

The superintendent of the Gooding Experiment Farm told of how one acre at the farm is divided into three parts for the purpose of testing out the pasturing possibilities of the land. It pays to have plenty of fencing, because the grass has so much better chance to develop. He started with two cows on this acre, but added a third later. During the 123 days' experiment the cows were changed fourteen times and they were allowed to stay on the same ground nine days. The pasture was irrigated nine times during the season. It produced 4,831 pounds of milk, making 217 pounds of butterfat, which, at 34 cents, meant a value of \$73. To this was added \$7 for skim milk and what hay was cut, making a total of \$83 for the season.

DEMONSTRATION WORK IN HOG FARMING
ON THE NORTH PLATTE PROJECT.

The committee, consisting of Messrs. Chilcott and Scofield of this Bureau, and Rawl and Rommel of the Bureau of Animal Industry, appointed last year to consider the matter of cooperative work between the two Bureaus on western projects, as announced in the WEEKLY BULLETIN of September 27, 1913, held a meeting on March 12 and considered the desirability of encouraging the production of live stock on irrigation projects. It was proposed that work be inaugurated on the North Platte Project at as early a date as possible.

The recommendations of the committee have been approved by the Assistant Secretary, and are summarized as follows:

21 March, 1914.

Hog Farming at North Platte (continued).

- (1) That a series of demonstrations in hog raising be carried out among the farmers on the North Platte Project.
- (2) That on this project, at least, the entire effort of the Department along animal husbandry lines be concentrated at present on hog raising and feeding.
- (3) That Mr. Charles S. Jones, of the Bureau of Animal Industry, a graduate of the Kansas Agricultural College, who now has charge of the pig club work in Alabama, be transferred to the North Platte Project and have immediate charge of the hog farming demonstration work to be done in that locality.
- (4) That the work begin as early as April 1, 1914, if possible.
- (5) That, in any work done to avoid the danger of the introduction of hog cholera, the field man have the assistance of the Biochemic Division of the Bureau of Animal Industry.

One of the significant points included in the recommendations of the committee is that the animal industry work should be taken up one industry at a time, and that all the effort be concentrated on that industry in the belief that by this method the industry can soon be placed on such a substantial basis that it will be self-supporting.

FIELD NOTES.

Yuma.

During the week ending February 21 the maximum temperature was 78, minimum 50; greatest daily range 22.

The following borders were disked: C37 to 40, D18, 25, and 26. These borders were also dragged.

The following borders were dragged: A3, B14 to 17, C22 to 25.

21 March, 1914.

FIELD NOTES.

Yuma (continued).

Arrow weed growth was cleared from the unlev-
eled portion of the C series, 1 to 5.

Alfalfa was seeded as follows: Peruvian—
A1, 4; B13, 15, and 17. Chilian—A3, B14 and 16.

Fig orchard C8 to 17 was cultivated and hoed.

Date plantings on A18 to 21 were cultivated.

Fig orchard C8 to 17 was pruned.

Deciduous orchard B25 to 30 was pruned.

Grapes on A15 were pruned.

Following is a summary of notes taken on frost
resistance of seedling figs for the past two sea-
sons:

Year	Minimum Temperature	Per cent uninjured	Per cent. injured but less than 50% growth killed	Per cent. injured more than 50% but root alive
1913	17° F	55.4	2.7	41.9
1914	24° F	46.1	1.0	53.9

The frost injury shown during the past winter was unexpected with a temperature of 24 degrees above zero as a minimum. The apparent cause of this injury seems to have been the preceding mild winter, rather than fall irrigating.

Cuttings were retained from the trees which matured fruit without insect pollination during the past summer.

One thousand Eucalyptus rudis trees were received in flats and transplanted to pots to prepare for road-way plantings on the west and south lines of the farm. A temporary plant shade house was erected for the present season's propagation work.

During the week of February 28 the maximum temperature was 78, minimum 34; greatest daily range 42.

Leveling was continued on the A series.

Lumber was hauled for the construction of an addition to the machinery shed and the building of a

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FIELD NOTES.

Yuma (continued).

temporary engine and pump house.

Arrow weed growth was cleared from rough land on D1 to 5, inclusive.

Work was resumed on the construction of the summer bunk house.

Heavy silt from the irrigation ditches was hauled to the tennis court to mix with the lighter soil.

An irrigation of 25 acres was applied on the 28th. Beginning the middle of March, water will be available throughout the season at seven-day intervals.

The following trees were received from the Austin Nursery Company, Austin, Texas, and planted to grounds and deciduous orchard B: Ornamentals, 5; Peaches, 31; plums, 4; apples, 10; pears, 4; pecans, 6.

Also 60 berries to be planted to A106 and 4 grape vines on A112. The first seedling date flower was noted on February 28.

During the week of March 7 the maximum temperature was 88, minimum 31; greatest daily range 47.

Borders B31 and 32, C21, D6 to 16, and D23 to 26 were disked.

Borders D37, 39, and 40 were plowed.

Vacancies where Eucalyptus trees are to be planted along the north and east fences were manured.

Leveling continued on the A series.

Clearing was begun on second growth of mesquite, willow, and arrow weeds on lower B series.

Lumber was hauled for building lockers in the bunk house.

Thirty Elaegnus angustifolia trees were transplanted from the nursery on A131 to a windbreak planting on B23.

The following trees which have been propagated here were transplanted to orchard B: Pears, 34; apples, 12; grapes, 12.

21 March, 1914.

FIELD NOTES.

Truckee-Carson.

During the week ending March 7 the maximum temperature was 67, minimum 20; precipitation 0; average wind velocity, 3.2; evaporation, 0.735.

Fourteen tons of manure were hauled to Y-9 and 16 tons to Y-7.

During the two weeks ending March 7 trees and shrubs were distributed as follows:

165 Carolina poplar; 78 Chinese poplar; 424 Russian oleaster; 1467 tamarisk; 27 Karagash elm; 4 American elm; 115 Chinese willows; and 102 weeping willows.

Cabbage varieties were planted in the hotbed.

The laying of tile in the Y drain and leveling of field Y were continued.

The greenhouse beds were made ready for the tomato, pepper, and eggplant varieties.

Messrs. Curtis and Headley attended a dairy meeting in the Northam schoolhouse on the evening of March 7. The stereoptican belonging to the Experiment Farm was used, with slides furnished by the Nevada State Experiment Station. Prof. Scott, of the State Station, gave the main talk of the evening, his subject being "Choosing a Dairy Cow".

The following plants were received from the Office of Seed and Plant Introduction:

Two plants, S.P.I. No. 7398, Amygdalus communis; 2 No. 33222, Prunus avium; 2, No. 26836, Prunus simonii; 2 No. 34684, Amygdalus persica nectarina; 2 No. 22620, Clematis recta mandshurica; 2 No. 30137, Eucommia ulmoides; and 2 No. 28710, Salix Humboldtiana.

Umatilla.

During the week ending March 14 the maximum temperature was 68, minimum 20; rainfall, trace.

Five hundred feet of pipe in fields D5 and C2 have been laid to carry water to land that has recently been leveled by filling in the canal which crossed the farm and has been abandoned by the Reclamation Service. Three hundred feet of this pipe

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21 March, 1914.

FIELD NOTES.

Umatilla (continued).

was relaid so as to carry water to the newly prepared land which formerly was above the canal.

The peaches in field D5, variety test of fruits in field C2, and grapes in field B5, were pruned.

Additional work was done with the team in filling the canal which crossed the farm, and several trips have been made about the project to assist farmers with the planning of their work and to make suggestions for carrying it out.

Scottsbluff.

The greater part of the week of March 14 was put in in cleaning up about the place. The hot bed was cleaned out and a new bed made. During the winter a number of branches of the trees were broken down, and these were cut off smoothly and the trees shaped up.

Friday Mr. Knoww attended a Farmers' Institute at Kimball, where there is located a private irrigation project. From all accounts, the farmers on that project have more grief than do the farmers on the government project. When the engineer planned the ditches in but a very few cases did they put in ditch banks where the upper side of the ditch was much higher than the lower side. The idea was that the water would fill back a little, form a small pool, and but little would be lost. In many cases these back waters were much larger than was figured on and it required as much as 36 hours running through some ditches to fill up these back waters, and in two instances the water seeped away as fast as it ran in to the pools. This winter a new bond issue was voted of \$7,000 to correct the error.

28 March, 1914.

STATISTICS FROM SIX RECLAMATION PROJECTS.

The crop reports recently furnished by the Reclamation Service make it possible to present some interesting statistics from the six Reclamation projects on which field stations are operated by this office. The tabulated material is so arranged as to facilitate comparisons of the statistics of 1912 with those of 1913.

Acreages and Farm Values.

The areas irrigated and the areas harvested on each of the six projects in 1912 and 1913 are stated in Table 1, together with the farm value of the crops harvested during the two years.

Table 1.

Project.	Acres irrigated.		Acres harvested.		Total farm value of harvested crop.	
	1912.	1913.	1912.	1913.	1912.	1913.
Yuma.....	13,767	19,607	11,060	16,726	\$ 497,012	\$ 610 228
Truckee-Carson	36,620	43,075	36,620	42,943	469,882	555,007
Umatilla.....	4,600	4,994	3,218	3,033	77,219	84,078
North Platte..	50,250	56,829	47,251	54,306	521,455	786,620
Huntley.....	14,425	15,798	12,742	15,798	350,771	464,697
Belle Fourche.	27,897	32,881	24,617	32,568	308,602	355,380
Six projects..	147,559	173,184	135,508	165,374	2,224,941	2,856,010

Table 1 shows that the irrigated acreage was greater on all six projects in 1913 than in 1912, the total gain on the six projects being approximately 26,000 acres. The area harvested was greater in 1913 than in 1912 on all six projects except Umatilla, where there was a decrease of about 200 acres. The net increase in area harvested on the six projects was about 30,000 acres. The total farm value of harvested crops increased on all six projects, the net increase on the six projects being about \$530,000.

The difference between the irrigated area and the harvested area is due to numerous causes; in many cases the non-bearing or-

28 March, 1914.

Statistics from six Reclamation projects (continued).

chards were an important cause of this difference, and newly planted alfalfa was another important item.

Average Farm Value per Acre of Crops Harvested.

In Table 2 the area of land from which crops were harvested on the six projects in 1912 and 1913 is stated, together with the average farm value per acre of harvested crops, and also the percentage gain or loss in 1913 as compared with 1912.

Table 2.

Project.	Acreage harvested.			Average value per acre of crops harvested.		
	1912.	1913.	Per cent. gain or loss	1912	1913	Per cent. gain or loss
Yuma.....	11,060	16,726	+ 51	\$44.94	\$36.48	- 19
Truckee-Carson	35,620	42,943	+ 17	12.83	12.92	+ 0.7
Umatilla.....	3,218	3,033	- 6	24.00	27.72	+ 15
North Platte..	47,251	54,306	+ 15	11.04	14.40	+ 30
Huntley.....	12,742	15,798	+ 24	27.50	29.35	+ 7
Belle Fourche.	24,617	32,568	+ 32	12.54	10.91	- 13
Six projects..	135,508	165,374	+ 22	\$16.47	\$17.31	+ 5

It is seen from Table 2 that the area from which crops were harvested on the six projects increased from 135,000 to 165,000 acres, a gain of about 22 per cent. The highest increase was 32 per cent, on the Belle Fourche Project. There was a gain of harvested acreage on all the projects except Umatilla, which decreased about 6 per cent.

The farm value per acre on the six projects increased from \$16.47 in 1912 to \$17.31 in 1913, an increase of about 5 per cent. The average farm value per acre increased on all the projects except Yuma and Belle Fourche, where there were decreases of 19 per cent and 13 per cent, respectively. The highest increase was 30 per cent, on the North Platte Project.

28 March, 1914.

Statistics from six Reclamation projects (continued).

Farm Unit Statistics.

The material included in Tables 1 and 2 has been recalculated and is presented on a farm unit basis in Table 3, which gives the number of farms, the average area irrigated, average area harvested, and average farm value of crops harvested per farm unit in 1912 and 1913, together with the percentage of gain or loss in 1913 as compared with 1912.

Table 3.

Project.	Number of Farms			Average per Farm.								
				Acres irrigated			Acres harvested			Farm value of crops		
	1912	1913	% gain or loss	1912	1913	% gain or loss	1912	1913	% gain or loss	1912	1913	% gain or loss
Yuma....	470	616	+ 31	29	32	+ 10	23	27	+ 17	\$1060	\$ 991	- 7
Truckee-Carson.	497	494	- 1	74	87	+ 17	74	83	+ 12	945	1124	+ 19
Umatilla	295	311	+ 5	16	16	--	11	10	- 9	262	270	+ 3
North												
Platte.	827	908	+ 10	61	62	+ 1	57	60	+ 5	630	866	+ 37
Huntley.	505	527	+ 4	29	30	+ 3	25	30	+ 20	695	882	+ 27
Belle												
Fourche	537	581	+ 8	52	56	+ 8	46	56	+ 22	575	610	+ 6
Six												
Projects	3131	3437	+ 9	47	50	+ 6	43	47	+ 9	\$711	\$831	+ 16

Table 3 shows that there were 3,131 farm units reported from the six projects in 1912 and 3,437 in 1913, the net increase being 9 per cent. The largest number of farm units is found on the North Platte Project. The number of farm units increased on all projects except the Truckee-Carson, where there was a decrease of 3, or about 1 per cent. The largest increase was on the Yuma Project, where the number of farms increased 31 per cent.

28 March, 1914.

Statistics from six Reclamation projects (continued).

Table 3 shows that on the six projects the number of acres irrigated per farm averaged 47 in 1912 and 50 in 1913, the increase in irrigated acreage per farm being about 6 per cent. The highest average irrigated acreage per farm was on the Truckee-Carson Project, where it was 74 in 1912 and 87 in 1913. In the WEEKLY BULLETIN of April 12, 1913, attention was called to the fact that the farm acreage on Truckee-Carson averaged high, but it was stated that "this is due to the fact that a large proportion of the total acreage is contained in a very few large units. Of the 36,620 acres irrigated, 11,561 acres were contained in 8 old ranches. Disregarding these 8 large ranches, and considering only the remaining 489 farm units, which had a total irrigated area of 25,059 acres, the average irrigated area per farm unit is 51 acres, instead of the 74 acres shown in the table". Doubtless the same condition influenced the average irrigated acreage per farm unit in 1913 as well as in 1912.

As shown in Table 3, the number of acres irrigated per farm increased on all six projects except the Umatilla, where it remained unchanged. The highest increase was on the Truckee-Carson Project, where it amounted to 17 per cent of the average acreage in 1912. The lowest increase was on the North Platte Project, where it was approximately 1 per cent.

The acreage harvested per farm as shown in Table 3 increased on the six projects from 43 acres in 1912 to 47 acres in 1913, an average increase of about 9 per cent. The harvested acreage per farm increased on all the projects except the Umatilla, where it decreased 9 per cent. The highest increase was 22 per cent, on the Belle Fourche Project.

The farm value of crops harvested per farm unit averaged on the six projects \$711 in 1912 and \$831 in 1913, the increase being about 16 per cent. The highest farm value of crops per farm unit in 1912 was \$1,060, on the Yuma, and \$1,124 in 1913, on the Truckee-Carson. The value of crops per farm increased in 1913 on all the projects except Yuma, where there was a decrease of 7 per cent. The highest increase was 37 per cent, on the North Platte.

Alfalfa.Acreage.—

Table 4 reports the acreage in alfalfa on the six projects in 1912 and 1913, together with the percentage of the total irrigated area which was occupied by alfalfa in each year and the

28 March, 1914.

Statistics from six Reclamation projects (continued).

per cent increase or decrease in 1913 as compared with 1912.

Table 4.

Project.	Acreage.			Percentage of irrigated area		
	1912	1913	Percentage gain or loss	1912	1913	Percentage gain or loss
Yuma.....	10,093	13,709	+ 36	73	70	-3
Truckee-Carson	16,231	18,483	+ 14	44	42	-2
Umatilla.....	2,442	2,320	- 5	53	46	-7
North Platte..	33,616	39,536	+ 18	67	69	+ 2
Huntley.....	4,561	4,848	+ 6	32	31	-1
Belle Fourche.	7,132	9,155	+ 28	26	28	+ 2
Six Projects..	74,075	88,051	+ 19	50.3	50.9	+ 6

The total acreage in alfalfa on the six projects, as shown in Table 4, was about 74,000 acres in 1912, and 88,000 acres in 1913; the increase amounting to about 19 per cent. The alfalfa acreage increased on all the projects except the Umatilla, where there was a decrease of about 5 per cent. The highest increase was about 36 per cent, on the Yuma.

Table 4 shows that alfalfa occupied approximately one-half of the total irrigated area on the six projects in 1912 and 1913. Of the total irrigated area on the six projects, alfalfa occupied 50.3 per cent in 1912 and 50.9 per cent in 1913, the increase being about 0.6 per cent. The proportion of irrigated land in alfalfa decreased in 1913 on all projects except North Platte and Belle Fourche, where it increased about 2 per cent in each case.

Average Yield and Farm Value.— In Table 5 the average yield per acre and the farm value per ton and per acre in 1912 and 1913 are stated. The average farm values per acre are based on the acreage actually harvested.

28 March, 1914.

Statistics from six Reclamation projects (continued).

Table 5.

Project.	Average yield per acre.			Farm Per ton.		Value. Per acre.		
			% gain or loss	1912	1913	% gain or loss	1912	1913
	1912	1913						
Yuma.....	3.73	3.69	- 1	\$10.00	\$7.53	- 25	\$37.30	\$27.83
Truckee-Carson	2.60	3.23	+ 24	7.00	7.00	...	18.21	22.61
Umatilla.....	3.40	3.96	+ 16	7.00	8.00	+ 14	23.80	31.66
North Platte..	2.20	2.30	+ 5	5.00	5.00	...	10.92	11.31
Huntley.....	2.60	3.45	+ 33	7.00	5.50	- 21	18.23	18.97
Belle Fourche.	2.06	2.10	+ 2	5.00	4.50	- 10	10.31	9.65
Six projects..	2.70	2.80	+ 4	\$6.84	\$6.15	- 10	\$17.89	\$17.26

Table 5 shows that on the six projects the average yield of alfalfa was 2.7 tons per acre in 1912 and 2.8 tons per acre in 1913, the average gain being about 4 per cent. The highest average yield per acre was secured on the Yuma Project, in 1912, and on the Umatilla, in 1913. The average yield was higher in 1912 than in 1913 on all the projects except the Yuma, where there was a decrease of 1 per cent. The highest increase was on the Huntley, where it was 33 per cent.

The farm value of alfalfa on the six projects averaged \$6.84 a ton in 1912 and \$6.15 a ton in 1913, the decrease being about 10 per cent. The price increased on one project—the Umatilla; decreased on the Yuma, Huntley, and Belle Fourche, and remained the same on the Truckee-Carson and North Platte. These farm values are presumably those obtaining in the fall of each year. According to reports recently received from Mr. Knorr, the present farm value of alfalfa on the North Platte Project is decidedly less than \$5.00 a ton, hay having been sold as low as \$2.00 a ton during the past winter.

The average farm value of alfalfa per acre on the six projects was \$17.89 in 1912 and \$17.26 in 1913, the decrease being

28 March, 1914.

Statistics from six Reclamation projects (continued).

about 3 per cent. The largest decrease was 25 per cent, on the Yuma. The average farm value per acre is reported to have increased on all other projects, except the Belle Fourche, where it decreased 6 per cent.

Total Production and Farm Value.— Table 6 shows the total production of alfalfa and the farm value per ton of alfalfa on the six projects in 1912 and 1913, together with the percentage gain or loss in 1913, as compared with 1912.

Table 6.

Project.	Production.			Farm value per ton.		
	1912 (Tons)	1913 (Tons)	Percentage gain or loss	1912	1913	Percentage gain or loss
Yuma.....	27,078	38,100	+ 41	\$10.00	\$7.53	-25
Truckee-Carson	33,595	45,132	+ 36	7.00	7.00	..
Umatilla.....	8,388	8,010	- 4	7.00	8.00	+ 14
North Platte..	42,604	61,728	+ 44	5.00	5.00	..
Huntley.....	8,930	16,725	+ 88	7.00	5.50	-21
Belle Fourche.	8,055	15,854	+ 97	5.00	4.50	-10
Six Projects..	128,650	185,549	+ 44	\$6.84	\$6.15	-10

Table 6 shows that the six projects produced 128,650 tons of alfalfa in 1912 and 185,549 tons in 1913, the increase in production being about 44 per cent. The total production increased on all the projects except the Umatilla, where there was a decrease of 4 per cent. The highest increase was 97 per cent, on the Belle Fourche.

In order to ascertain whether there was a direct relationship between the total production of alfalfa and the farm value per ton, the second division of Table 6 shows the farm value per ton of alfalfa on the six projects during the two years. The

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Statistics from six Reclamation projects (continued).

average price on the six projects was \$6.84 in 1912 and \$6.15 in 1913, the decrease being about 10 per cent. The table shows that increased production was accompanied by a decreased farm value on the Yuma, Huntley, and Belle Fourche projects, but that no such decrease occurred on the Truckee-Carson and the North Platte projects, where there were increases in production of 36 and 44 per cent, respectively. As stated in the preceding paragraph, however, the price of alfalfa appears to have decreased markedly on the North Platte since the Reclamation Service obtained these figures. It is possible that the price on the Truckee-Carson was maintained in the face of increased production because of the fact that a great deal of live stock was brought to the project during the fall and winter. It is not known, however, just how effective these live stock importations have been in this connection.

Grains.

In order to show the acreage devoted to grains on the six projects and whether or not the proportional acreage is increasing, Table 7 has been prepared. This table shows the acreage devoted to grains and the per cent. of the total irrigated area which was devoted to grains on the six projects in 1912 and 1913, together with the per cent. gain or loss in 1913 as compared with 1912 in each case.

The crops included as grain were as follows: Yuma, barley, corn, grain sorghum, wheat. Truckee-Carson, wheat, barley, oats, North Platte, rye, barley, corn, oats, wheat. Huntley, barley, corn, flax, oats, spelt, wheat. Belle Fourche, rye, barley, corn, flax, oats, wheat.

Corn was relatively unimportant on all the projects except the North Platte and Belle Fourche. In 1912, on the North Platte, there were 6,260 acres in corn, and in 1913 there were 3,561 acres. On the Belle Fourche, corn was harvested from about 1,850 acres in each of the two years.

28 March, 1914.

Statistics from six Reclamation projects (continued).

Table 7.

Project.	Acreage.			Per cent. of irrigated area		
	1912	1913	Percentage gain or loss	1912	1913	Percentage gain or loss
Yuma.....	2,847	4,802	+ 69	21	24	+ 3
Truckee-Carson	5,132	3,753	-27	14	9	-5
Umatilla.....	000	56	..	..	0.1	+ 0.1
North Platte...	22,895	17,592	-23	45	31	-14
Huntley.....	3,983	5,772	+ 45	28	37	+ + 9
Belle Fourche.	18,899	21,332	+ 13	68	65	-3
Six projects..	53,756	53,307	-1	36	30	-6

It is shown in Table 7 that in both 1912 and 1913 the six projects produced about 53,000 acres of grain. There was a decrease of about 1 per cent in 1913 as compared with 1912. There was an increase in the total acreage in grain on the Yuma, Huntley, and Belle Fourche projects, and a decrease on the Truckee-Carson and North Platte. The grain acreage on the Umatilla was reported as zero in 1912 and 56 acres in 1913.

The table shows that on the six projects an average of 36 per cent of the irrigated area was devoted to grain in 1912 and 30 per cent in 1913, the decrease being about 6 per cent. The proportion of irrigated land in grain increased on the Yuma, Umatilla, and Huntley, and decreased on the other three projects.

It should be borne in mind that much of the grain reported in the above acreages was planted as a nurse crop for alfalfa. The crop reports are not all entirely clear on this point, so that it is not possible to decide definitely in all cases just how many acres were planted to nurse crops. For this reason the figures in Table 7, showing the proportion of irrigated lands in grains, are only approximately correct.

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WEATHER BULLETIN.

The Weather Bureau has been asked to send to each of the farms regularly a copy of the National Weather Bulletin. This is a chart, issued weekly during the crop season and monthly during the winter, containing meteorological data and a summary of the weather conditions of the preceding week.

EXPERIMENTS WITH HOGS AT SCOTTSBLUFF IN 1914.

The following pasturing and dry-lot feeding experiments with hogs are to be conducted at Scottsbluff Experiment Farm during the season of 1914:

Pasturing Experiments.— In these experiments 1/4-acre plats of alfalfa will be used for each lot. The supplementary rations are indicated in terms of percentage of the live weight of the hogs, the indicated percentage to be fed daily.

Lot.

1. Alfalfa pasture alone. (
2. Alfalfa pasture, 1% corn.) Each plat divided into
3. Alfalfa pasture, 3% corn. (two pastures.
4. Alfalfa pasture, 2% barley.)
5. Alfalfa pasture (not divided), 2% corn.
6. Alfalfa pasture (divided into two pastures), 2% corn.
7. Alfalfa pasture (divided into three pastures), 2% corn.
(This lot will be omitted if there are not enough
hogs for all nine lots.)
8. Alfalfa pasture, brood sow and litter.
9. Alfalfa pasture, brood sow and litter.
(Lots 8 and 9 are duplicates).

The pasture will be stocked to full carrying capacity at the beginning of the experiment. If the pasture becomes overgrazed, some of the hogs will be withdrawn. Each hog will be weighed separately, so that an average hog can be withdrawn. Hogs will not be added to any plat, even though the pasture is not kept down.

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Experiments with hogs at Scottsbluff (continued).

Finishing on pasture and on dry-lot.— The experiments in finishing hogs are outlined below:

Lot.

10. Alfalfa pasture, 4% corn (hogs to be taken from Lot 6).
11. Alfalfa pasture, 4% barley (hogs to be taken from Lot 4).
12. Corn alone.
13. Corn, 6; tankage, 1.
14. Barley alone.
15. Barley, 6; tankage, 1.

The hogs to be used in Lots 12, 13, 14, and 15 are to be taken from lots that received at least a 2% grain ration in the pasturing experiment.

Lot.

16. Corn alone.
17. Corn, 6; tankage, 1.
18. Barley alone.
19. Barley, 6; tankage, 1.

The hogs to be used in these last four lots are to be taken from lots that received 1% or less of grain in the pasturing experiment.

FIELD NOTES.

Truckee-Carson.

During the week ending March 14 the maximum temperature was 71, minimum 26.

The leveling of Field Y and construction of the Y drain were continued.

During the past two weeks 16.5 tons of manure were hauled to Y7, 16.7 tons to Y9, and 18.1 tons to Y13.

The tomato, pepper, and eggplant varieties in the greenhouse and hotbeds were planted during the week.

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FIELD NOTES.

Truckee-Carson (continued).

Mr. J. E. Dorman, of the Bureau of Animal Industry, was a visitor at the farm on the 12th, 13th, and 14th. He was shown over the project by Mr. Heisey in his automobile, so was able to visit every important dairy herd in a short time. On the evening of the 21st Mr. Dorman spoke in the Soda Lake School House, in place of Mr. Headley, who had been called upon to give an illustrated talk on that night.

San Antonio.

The maximum temperature during the week ending March 14 was 78.5, minimum 25; no rainfall.

It is expected that considerable damage to the fruit crop will result from the unseasonably cold weather that prevailed during the week.

The corn on the rotation plats was just coming up, so but little injury occurred.

The distance-of-planting-and-thinning test with milo was planted on the south end of C-5 on the 14th with 14 plats, as follows:

Plat.	Distance of rows apart-feet.	Distance apart in row-inches.
1	5	2
2	4	not thinned
3	4	2
4	4	5
5	4	8
6	4	12
7	4	18
8	4	24
9	4	(To be subdivided and the milo (thinned at various stages of growth.
10	4	check
11	3 ft. 9 in.	5
12	3 ft. 6 in.	5
13	3 ft. 3 in	5
14	3 ft	5
15	Sudan durra	
16	Dwarf kafir	

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FIELD NOTES.

San Antonio (continued)

The north end of B4 was planted to Chinese corn for Mr. Collins on the 14th, the corn to be thinned varying distances apart in the row. Six varieties of sweet corn were planted in the same field.

Weeds were cut out of the various orchards during the week.

Yuma.

The following table reports the results obtained in the alfalfa seed experiments in 1913.

Variety and Location	Date Seeded	Planting method	Date of harvest	Cutting left for seed.	Yield per acre-pounds.	
					Seed	Total hay and seed hay.
<u>Chilian.</u>						
B-31-32	3/25/12	row-- 7"	7/28	3rd	221.0)	
do	do	14	"	"	146.0)	
do	do	21	"	"	176.4)	10,690
do	do	28	"	"	182.0)	
do	do	35	"	"	218.5)	
C-27	10/19/11	broadcast	"	2nd	666.0	8,845
C-28	do	"	"	3rd	290.8	6,695
<u>Peruvian.</u>						
C-39	3/20/12	"	7/25	2nd	490.5	9,780
C-40	do	"	8/2	3rd	258.2	15,710
C-42	11/6/12	row--44"	8/5	2nd	67.3	3,724
C-43	do	44"	"	"	61.2	3,439
C-44	do	36"	"	"	76.8	4,218

The number of irrigations applied to the plats reported on above and the quantity of water used on each plat during the season of 1913 are stated below.

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FIELD NOTES.

Yuma (continued).

Variety and location	Area of plat. acres.	Water used, acre feet.		Number of irrigations
		Total.	Per acre.	
<u>Chilian</u>				
B-31-32	1.07	6.70	6.26	11
C-27	0.56	3.79	6.77	12
C-28	0.544	3.92	7.21	12
<u>Peruvian.</u>				
C-39	0.509	1.62	3.18	6
C-40	0.542	2.28	4.21	8
C-42	0.538	2.27	4.22	8
C-43	0.557	2.10	3.77	7
C-44	0.518	1.76	3.40	6
Totals.....	4.84	24.44	5.00	

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PERIODICALS.

Receipt of to be acknowledge promptly.

The Bureau Property Room complains of the long delay in securing receipts for requisitions covering subscriptions to periodicals for the various farms. It is requested that superintendents make an effort to notify this office promptly of the receipt of periodicals, under both new subscriptions and renewals of old ones.

WEEKLY BULLETIN.

In making up Vol. IV of the WEEKLY BULLETIN for binding we find ourselves short of extra pages, and if any of the farms have no use for their regular weekly copies after the bound volume is received it would be appreciated if they could be sent in to this office.

FIELD NOTES.

Umatilla.

During the week ending March 21 the maximum temperature was 70, minimum 25.

Considerable work was done in laying more pipe line and in cleaning out irrigation ditches.

Some fencing was repaired and machinery painted.

The hot-bed was prepared and planted to two varieties of eggplants—Black Beauty and New York.

Fields Cld, Cle, and Blb were marked off preparatory to irrigating.

Field A2 (garden) was treated with a dressing of stable manure.

Fields B3 and B2c were seeded to alfalfa.

The work of finning in and grading the north end of field C2 was finished and the graded land seeded down.

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FIELD NOTES.

Umatilla (continued).

The pruning on field C2 (variety test) was completed.

Also the pruning on fields C1 and D1.

During the week of March 7 the maximum temperature was 65, minimum 26.

Considerable work was done in filling the canal which corrsed the farm and has been abandoned by the Reclamation Service.

Field notes were taken on the stand of vetch and rye on field A4c for seeding experiment; also the stand of vetch in fields A3a, B2b, and B3b.

A spraying experiment for the control of the peach twig borer was carried out in field C2 (variety test of fruits).

Truckee-Carson.

During the week of March 21 the maximum temperature was 68, minimum 28.

The leveling of Field Y was completed.

The following varieties of onions were planted on the experiment farm and on the farm of Geo. Burton: Mammoth Silver King, Large Red Globe, Large Red Wethersfield, Southport Large Red Globe, Red Wethersfield (native seed), Extra Select Ohio Yellow Globe, Select Yellow Globe Danvers, Southport Yellow Globe, Mammoth Yellow Prizetaker, Australian Brown.

The following trees, shrubs, and small fruits were received from the Stark Bros. Nurseries: Raspberries: 5 each of Columbian, Cuthbert, Haymaker, Hervert, King, Cumberland, Golden Queen, and Kansas. Blackberries: 5 each of Kittantinny, Taylor, Eldorado, Snyder, Ward, Wildon, and Merserean. Gooseberries: 1 Carman, 1 Portage, 1 Oregon Champion, 2 Houghton. Quince: 2 Van Deman, 2 Bourgeat. Ornamentals: 1 Clematis Jackmani, 1 Yucca filamentosa, 1 Maidenhair tree.

4 April, 1914.

FIELD NOTES.

Truckee-Carson (continued).

W. A. Vanvoorhis, at the Indian School, has been digging for artesian water. An artesian flow has been obtained at a depth of about 400 feet, but the water contains too great a percentage of soluble salts to be suitable for domestic purposes.

Scottsbluff.

Mr. Knorr reports fine weather on Monday and Tuesday of the week of March 21, the maximum temperature being 58. On Wednesday and Friday terrific windstorms occurred and the temperature dropped to 7 above.

The wind drifted considerable sand; the machine shed was pushed about 6 inches out of plumb, and considerable fencing was torn off as a result of weeds piling against the fence.

On Monday the weeds were raked off the dry land plats and burned.

Tuesday some grading was done on the road about the buildings, and a low place near the barn was filled in to prevent irrigation water from standing at that point.

The work of pulling up the black locusts that were planted west of the barn was started. In the three years these black locusts have been grown they have frozen down each winter, and although there was a comparatively mild winter this year not one tree came through in good shape.

Mr. Knorr refers to his report of March 14, in which he mentioned the fact that a large number of farms are being rented this year, and says: "In a report for the year 1913 Mr. Paul Rothi, Irrigation Manager, states: 'This makes a total of 293 farms rented, or 33 per cent of farms cropped were farmed by renters.' Fifty per cent of the renters were homesteaders who worked their own farms and rented another near by.' Mr. Rothi stated that this year more farms are rented out than last season."

4 April, 1914.

FIELD NOTES.

Scottsbluff (continued).

During Mr. Knorr's Farmers' Institute visit at Kimball during the previous week his attention was called to a large ranch east of Kimball, known as the "Bennet" ranch. He was told that at one time more than 100 Holsteins were milked at this place and many hundred hogs were fed. The products were sent to supply one of the large hotels at Cheyenne, Wyo. At this time very little is being done on this farm. Upon closer investigation since, Mr. Knorr has learned that the hogs were fed all of the surplus milk and that this was a source of large income. One entire shipment of hogs to Denver from this farm was condemned on account of tuberculosis. Becoming suspicious, the owners had the cows tested and found that but a few individuals failed to react.

In urging the farmers to go into the hog work, and especially those that intend to grow their own feeders, this fact should be kept in mind. It would be rather hard to eradicate this disease if a herd of brood sows were once affected.

During the week of March 28 manure was hauled on the fall-seeded alfalfa. This alfalfa came through the winter in very good shape.

The weeds and trash were raked off the grass plats. Indications are that the grass plats with the exception of the wheat grass and the orchard grass will make a good stand. The blue grass is the first grass to start the spring growth, having sent out the first shoots March 24.

The plow and disk harrow were put to work on the dry land on the 28th. If the weather holds out seeding will begin shortly after next week.

Mr. Holden and Mr. Jacobson have returned to their work.

4 April, 1914.

FIELD NOTES.

Umatilla.

During the week ending March 28 the maximum temperature was 70, minimum 23.

Work was continued on replacing the pipe lines to cover land leveled by filling in the north line canal.

Fields A4 and D3 were irrigated; D3 sown to field peas; and B2c to alfalfa.

An experiment in pasturing hogs on alfalfa was begun. On account of the small amount of alfalfa being grown, the area was necessarily small. One-half acre is divided into two plats, one of which is to be pastured and hay cut from the other to compare the value of the hay with the returns derived from pasturing. The test is to be carried out in field C1, plat e.

A series of heavy frosts has practically destroyed the peach crop in this section of the State. Blossoms began opening 26 days earlier than last season, which is partially responsible for the loss. Several orchards were heated, but it is not known to what extent the work was successful.

Huntley.

No field work was possible during the week of March 28 because of stormy weather. There has been a light fall of snow and rather severe freezing.

The winter has been unusually mild and there has been but little winter injury to the fruit trees.

Winter grains both at Osborn and Worden are in good condition, although there has been practically no snow during most of the winter.

During the past month, since the ground began to thaw, there has been a rapid rise of the ground water on the Worden tract. Following are

4 April, 1914.

FIELD NOTES.

Huntley (continued).

the depths to ground water as measured in the four wells since January 1.

Date.	Well Numbers.				Aver- age
	A - 1	A - 2	B - 1	B - 2	
January 2	3.08	3.38	3.59	3.47	3.38
	16	2.63	2.94	3.21	2.98
February 1	3.08	3.39	3.58	3.49	3.38
	14	3.45	3.74	3.87	3.73
March 1	2.71	3.04	3.39	3.40	3.13
	15	1.66	2.05	2.54	2.60
	28	1.54	1.88	2.55	2.52

The drain which was started by the Reclamation Service last fall south of the Northern Pacific tracks has been extended to a point only about one-half mile west of the west line of the tract, and had apparently not reached far enough to intercept the flow of underground water that is affecting this area. Work on the extension of this drain will probably not be resumed until some time in May, and will therefore not be completed in time to do much good this season.

A large number of the farms on the project have been rented at prices from \$6 to \$8 per acre. Most of the renters are foreigners—Russians and Belgians—who have previously done the contract hand labor in beets. These renters generally expect to grow beets this season. About 5,000 acres of beets have been contracted on the project, which is about the same acreage as last season. In the entire Billings district about 19,000 acres will be grown this year, which is about 5,000 acres less than in 1913.

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THE SAN ANTONIO ROTATIONS.

The rotation experiments at San Antonio have been in progress since 1909. Five years' results have now been obtained from all the rotations except those which have been started since the rotation work was inaugurated. When the work was started in 1909 very little was known as to what crops were best suited to the conditions of the San Antonio region. Corn and cotton were the chief crops grown by the farmers, and the rotations were so planned as to give these two crops the greatest prominence. In the beginning it was thought that cowpeas would be a reliable crop to include in the rotations for green manure purposes. The only dependable small grain crop in the region is oats, and this crop is also frequently cut for hay. In addition to oats cut for hay, sorghum is an important forage crop. The original rotations, therefore, included corn, cotton, cowpeas, oats for hay and for grain, and sorghum for forage.

As the work progressed it was found that certain crops were not so well suited to the region as other crops, and it was thought advisable to make certain substitutions in the rotations. Experiments at the farm have shown that grain sorghum is a more dependable grain crop than corn and that, as a green manure crop, Canada peas are far superior to cowpeas in the San Antonio region. For this reason grain sorghum (milo) has been substituted for corn and Canada peas for cowpeas in several of the rotations where these substitutions could be made. Corn and cow peas have been retained in some of the rotations, however, so as to furnish comparative results during a long series of years. Most of the substitutions were made in 1912 and 1913. Such favorable results were secured in 1911 and 1912 with Sudan grass that it was thought advisable to include this crop in the rotation experiments, and in 1913 a new 3-year rotation of milo, Sudan grass, and cotton was started. The crops now included in the experiments are corn, milo, oats for grain and for hay, cotton, sorghum, and Sudan grass.

There are now in all 35 rotations, and 14 plats are devoted to continuous cropping with oats, corn, cotton, milo, and sorghum, respectively. There are 26 two-year, 4 three-year, and 5 four-year rotations. These rotations and the continuous cropping occupy 98 quarter-acre plats. The work includes studies of the effect of crop sequence, of various methods of tillage, and the use of barnyard manure and green manure.

11 April, 1914.

San Antonio Rotations (continued).

Average Yields.— The number of plats in each crop and the average yield of each crop each year since 1909 are stated in the first table. The yields of sorghum, Sudan grass, and oats for hay are stated as tons per acre; those of corn, oats, and milo as bushels per acre, and the yields of cotton as pounds of seed cotton per acre.

Crop.	Number of Plats and Average Yield.											
	1909.		1910.		1911.		1912.		1913.		5 years	
	Plats	Yield	Plats	Yield	Plats	Yield	Plats	Yield	Plats	Yield	Plats	Yield
Corn	27	9.80	23	8.0	29	10.6	26	34.1	21	34.9	19.5	
Milo	..	....	..	...	..	....	5	40.0	14	47.7	43.8 ¹	
Oats, grain	4	0.0	12	10.7	11	8.5	10	26.75	9	11.7	11.5	
Sudan grass	..	...	..	....	..	...	..	....	.1	5.33	5.33 ²	
Oats, hay	4	0.13	4	0.88	4	1.33	4	2.81	8	2.67	1.56	
Sorghum	7	1.42	7	2.06	8	3.61	8	4.27	11	6.43	3.56	
Cotton	23	539.7	24	371.2	25	483.0	25	621.5	30	560.1	535.1	

¹ Two years² One year

As shown in Table 1, the average yields of oats for hay and of sorghum increased during the five years, and the average yields of corn, oats for grain, and cotton fluctuated. It is important to note that in 1912 and 1913, when milo was included in the rotations, the grain yield of this crop exceeded considerably that of both corn and oats, in spite of the fact that the average yields of corn and oats were higher in 1912 and 1913 than in any other years.

11 April, 1914.

San Antonio Rotations (continued).

Effects of Crop Sequence and Cultural Treatment.

The effect of crop sequence has not yet become very noticeable, but several cultural treatments have shown very marked effects. In order to show these effects, it is necessary to explain the method used in the office, where the yields are recorded on cards. These cards show, among other things, the yield of the plat, the average yield of all the plats producing the same crop, the number of plats producing the crop, and the relative position, among these plats, of the yield of the plat in question. For example, if there are 25 plats of cotton in the rotations, the highest yielding plat would have a position of 1 and the lowest yielding plat a position of 25. In this way the relative value of a given crop sequence or of a given cultural treatment for a particular crop is directly indicated.

Some of the most striking effects so far observed are those of continuous cropping, subsoiling, fallowing, rye green manuring, and the use of barnyard manure.

Continuous Cropping.— The results with continuous cropping of corn, cotton, sorghum, oats for hay, and oats for grain are indicated below, where the position of the yield of the respective continuously cropped plats and the total number of plats are stated.

Year	Corn.		Cotton.		Sorghum ¹		Sorghum ²		Oats—hay		Oats—grain	
	Posi-	Plats	Posi-	Plats	Posi-	Plats	Posi-	Plats	Posi-	Plats	Posi-	Plats
1909	20	27	4	23	4	7	6	7	4	4	(Failure)	
1910	20	28	21	24	4	7	7	7	4	4	9	12
1911	23	29	17	25	5	8	2	8	3	4	8	11
1912	21	26	24	25	6	8	4	8	2	4	9	10
1913	15	21	20	30	7	11	11	11	5	8	4	9

¹ Planted in rows and intertilled.

² Planted in 6-inch drills.

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San Antonio Rotations (continued).

It will be noted that the yields of the continuously cropped plats have generally been low, as indicated by the figures showing relative position in the above table.

Subsoiling.— The results obtained with subsoiling have, without any important exception, been against the practice. As stated in B. P. I. Circular No. 114, "Experiments in Subsoiling at San Antonio", published in February, 1913, subsoiling has resulted in either decreased yields (or in increases insufficient to pay for the operation) of corn, cotton, and oats. The results secured in 1913 corroborated the conclusions published in the circular above mentioned. In the table below the yields obtained in 1913 are stated as percentages, the yields of the check plats (not subsoiled) being considered as 100 per cent. The yields considered are those obtained from all the rotations in which subsoiling is practised and which are comparable with other rotations in which subsoiling is not practised, and also those obtained from these latter rotations.

Crop.	Number of Plats.		Average yield, in percentages.		Gain or loss, Per cent.
	Not subsoiled	subsoiled	Not subsoiled	subsoiled	
Corn.....	4	4	100.5	100	+ 0.5
Cotton.....	5	5	98.0	100	- 2.0
Oats, grain..	1	1	84.0	100	--16.0
Oats, hay....	1	1	85.0	100	-15.0
Milo.....	1	1	106.0	100	+ 6.0
All crops....			94.7	100	- 5.3

As shown above, the subsoiled plats gave slightly increased yields of corn and milo in 1913; but, considering all the crops, subsoiling decreased the yields an average of 5.3

11 April, 1914.

San Antonio Rotations (continued).

per cent. The small increases obtained with corn and milo were not sufficient to cover the cost of subsoiling.

Fallowing.— Since 1910 fallowing has been tested in connection with corn, cotton, and oats for grain, each crop being grown on land that is fallowed in alternate years. Relatively low yields have been secured with corn and cotton and relatively high yields with oats, as is shown below, where the relative positions of the yields obtained on the alternately cropped plats during the past four years are indicated.

Year.	Corn.		Cotton.		Oats.	
	Position	Plats	Position	Plats	Position	Plats
1910.....	26	28	23	24	11	12
1911.....	28	29	25	25	4	11
1912.....	25	26	25	25	1	10
1913.....	19	21	30	30	1	9

The table shows that fallowing has been decidedly detrimental to corn and cotton, the position of the alternately cropped cotton and corn plats having been at or near the bottom throughout the period. The position of the alternately cropped oat plats has been high since 1911; but it must be remembered that to get the relatively high yields it is necessary to use double the area of land-- that is, one-half the land is fallow each season. In his manuscript discussing these fallowing experiments, recently prepared for publication, Mr. Letteer states that fallowing is not an economically feasible practise, even for oats, in the San Antonio region.

Green Manuring.— Both cowpeas and rye have been used as green manure in the rotation experiments, and Canada peas were introduced in 1913 in place of cowpeas in certain rotations, as previously mentioned. The growth of cowpeas has generally been so slight that the green manuring effect has probably been negligible. In two rotations, one of which includes the use of rye as green manure, generally consistent results have been obtained. These rotations are:

11 April, 1914.

San Antonio Rotations (continued).

B6-F

Corn; disk in July.Cotton; plow in November.

B6-I.

Corn; disk in rye after harvest; plow in February.Cotton; plow in November.

The positions of the plats in these rotations are given below:

Year.	Corn.			Cotton.		
	Plats	Position.		Plats	Position	
		Rye	No rye		Rye	No rye
1909.....	27	3	1	23	7	1
1910.....	28	14	7	24	5	3
1911.....	29	16	15	25	22	3
1912.....	26	13	9	25	15	9
1913.....	21	16	6	30	28	2

It is seen that the position of the corn and cotton plats on which rye has been used as green manure has declined, while the corn and cotton plats in the rotation where no green manure has been used have maintained relatively high positions. It may be that the comparatively low yields on the green-manured plats were due in part to spring plowing, but spring plowing necessarily accompanies green manuring.

It is too early to know what effect will be produced by Canada peas used as green manure, since this crop was not introduced into the rotations until 1913. In the spring of 1913 Canada peas were plowed under on two plats. The estimated yield of green material was about 15 tons per acre. From the results secured in 1913, it seems certain that Canada peas will be an excellent green manure crop, at least so far as the production of green material is concerned.

11 April, 1914.

San Antonio Rotations (continued).

Manuring. — The effect of using barnyard manure has not been marked. Some crops have been benefited some years and in other years the yields have not been increased by the manure. The manure is applied at an average rate of 16 tons per acre. In the case of corn, manure appears to have increased the yield on the continuously cropped plats as compared with that obtained without manure. The figures given below represent the results obtained from two plats continuously cropped to corn. One plat is not manured and the other receives manure each year. On this latter plat cowpeas have been planted, but have failed to make any considerable growth each year, so that the increased yields are believed to be due to the manure.

Year.	Number of plats	Position.	
		Manured	Not manured
1909.....	27	11	20
1910.....	28	19	25
1911.....	29	11	23
1912.....	26	17	21
1913.....	21	17	15

While, as shown above, the manured plat has usually ranked higher than the unmanured plat, the former has not yielded much above the average of all the corn plats in the rotations.

A similar comparison of the two continuously cropped cotton plats is made below:

11 April, 1914.

San Antonio Rotations (continued).

Year	Number of plats	Position.	
		Manured	Not manured
1909.....	23	17	4
1910.....	24	20	21
1911.....	25	10	17
1912.....	25	16	24
1913.....	30	18	20

In the case of cotton, manuring has apparently maintained the yield on the continuously cropped plat. While the unmanured plat has shown a tendency to decline in productivity, the manured plat has practically held its own.

In a 2-year rotation of corn and cotton (Rotation B6-C) where manure is applied after the cotton is harvested, the yield of cotton has generally increased, relatively, while the relative yield of corn has fluctuated widely, as is shown below:

Year	Number of plats		Position.	
	Corn	Cotton	Corn	Cotton
1909.....	27	23	7	14
1910.....	28	24	9	7
1911.....	29	25	8	9
1912.....	26	25	2	8
1913.....	21	30	18	1

11 April, 1914.

San Antonio Rotations (continued).

Manure has shown some beneficial effects on Plat A6-2, where corn was grown in 1909, 1910, and 1911, and milo in 1912 and 1913. Plat A6-2 receives manure each year, and Plat A6-1, which is cropped the same as A6-2, is unmanured. Cowpeas are used as green manure on A6-2, but these have failed to make growth of any consequence. The relative positions of these plats are given below:

Year	Crop.	Number of plats	Position.	
			Manured	Not Manured
1909.....	Corn	27	12	13
1910.....	do	28	1	3
1911.....	do	29	2	7
1912.....	Milo	5	1	5
1913.....	do	14	8	14

The results obtained from manuring have been variable. In many cases they have been contradictory. Possibly the effect of manuring will be more marked after the experiments have been continued for a longer period. So far, manuring has shown but few strikingly beneficial effects.

Some General Tendencies.— As has been stated, the more conspicuous results so far obtained have been due to cultural treatments, rather than to crop sequence. It is possible, however, by considering particular plats, to observe certain general tendencies which apparently result, in part at least, from crop sequence. In some cases the plats have increased in productivity, in others they have decreased, and in still others the productivity, as judged from the relative yields, has remained high or low. In some instances the relative yields of one crop in the rotation have increased while those of another crop in the same rotation have failed to increase. A few examples illustrating these conditions will be given.

11 April, 1914.

San Antonio Rotations (continued).

A good example of a rotation producing relatively high yields is Rotation A6-a, on Plats A6-7 and A6-8. This is a 2-year rotation of corn, plow in July; oats for hay, plow in May. The rank of the yields of these plats is indicated below:

Year	A6-7			A6-8		
	Crop.	Number of plats	Position	Crop.	Number of plats	Position
1909.....	Corn	27	10	Oats	4	1
1910.....	Oats	4	2	Corn	28	4
1911.....	Corn	29	3	Oats	4	1
1912.....	Oats	4	3	Corn	26	1
1913.....	Corn	21	1	Oats	8	1

With the single exception of oats on Plat A6-7 in 1912, this rotation has ranked very high during the 5-year period, and, as far as corn is concerned, the tendency is upward, as is indicated by the positions—10-4-3-1-1. High standing and upward tendencies have been noted in several other rotations.

As would be expected, the continuously cropped plats generally rank low. This is indicated below, in connection with four continuously cropped, unmanured plats:

Year	B5-1—Corn.		B5-3—Cotton.		B5-5—Sorghum		B5-7—Oats-hay	
	Plats	Position	Plats	Position	Plats	Position	Plats	Position
1909	27	20	23	4	7	4	4	4
1910	28	25	24	21	7	4	4	4
1911	29	23	25	17	8	5	4	3
1912	26	21	25	24	8	6	4	2
1913	21	15	30	18	11	7	8	5

11 April, 1914.

San Antonio Rotations (continued).

Examples of general downward tendencies are given below. Plat B5-3 is continuously cropped to cotton (plowed in November) and Plats B6-17 and B6-18 are in a 2-year rotation of corn, disk in rye after harvest, plow in February; cotton, plow in November.

Year	B5-3			B6-17			B6-18		
	Crop	Plats	Position	Crop	Plats	Position	Crop	Plats	Position
1909	Cotton	23	4	Corn	27	3	Cotton	23	7
1910	do	24	21	Cotton	24	5	Corn	28	14
1911	do	25	17	Corn	29	16	Cotton	25	22
1912	do	25	24	Cotton	25	15	Corn	26	13
1913	do	30	18	Corn	31	16	Cotton	30	24

As shown above, the positions of the corn plats in the 2-year rotation during the 5-year period were 3-14-16-13-16, and of the cotton plats in the same rotation 7-5-22-15-24. It is important to note that the positions were high in the beginning of the period, indicating that the productivity of the soil was relatively high at that time. The general decline in the relative yields of the two crops indicates that the rotation is relatively inferior. As would be expected, the yield of the continuously cropped and unmanured cotton plat declined considerably during the period.

Rotation B5-C, on Plats B5-13 and B5-14, serves as an example of a rotation which is relatively favorable to one crop and unfavorable to another. This is a 2-year rotation of corn, plow in July; sorghum in 4.1 ft. drills, plow in November. The positions of these crops on the two plats in the rotation are shown below:

Year	Plat B5-13			Plat B5-14		
	Crop	Plats	Position	Crop	Plats	Position
1909	Corn	27	24	Sorghum	7	2
1910	Sorghum	7	1	Corn	28	23
1911	Corn	29	21	Sorghum	8	6
1912	Sorghum	8	3	Corn	27	20
1913	Corn	21	12	Sorghum	11	1

11 April, 1914.

San Antonio Rotations (continued).

That this rotation is relatively favorable to sorghum is shown by the positions which the sorghum occupied—2-1-6-3-1. That it has been rather unfavorable to corn is shown by the positions of the corn—24-23-21-20-12—although there has been some tendency for the relative yield of corn to rise. Similar situations are found in connection with one or two other rotations at San Antonio.

As would be expected, the effect of crop sequence has been less pronounced in the long rotations than in the shorter rotations. It will probably be several years yet before very marked effects are noted in the 3-year and 4-year rotations, particularly the latter. But, as has been stated previously, some very valuable results are being secured incidentally each year in connection with the cultural treatments included in the rotation work, and the reliability and value of these results increase as the work progresses.

F. D. F.

LUMBER
Vouchers for to give number of pieces .

The Office of Records requires that all vouchers for lumber state the number of pieces covered by each item, as well as the dimensions and number of thousand feet.

This information is required in checking the computations on the face of the voucher and is not regarded, necessarily, as a check on the number of lumber feet received. Of course in the case of sheathing and other stuff running in odd widths it will be impracticable to give the number of pieces, and in such cases the information will be waived.

PERSONAL.

Mr. Hastings arrived in Washington April 1 for a conference in connection with the lease of the San Antonio Farm and other matters in connection with the future work of the station.

11 April, 1914.

FIELD NOTES.

San Antonio.

The maximum temperature during the week ending March 28 was 80.5, minimum 31; greatest daily range 28. Frost occurred on the mornings of March 22 and 23, which resulted in some damage to the corn, which was up, and to the fruit crop. Although a large part of the week was cloudy and rainy, the total precipitation was on 0.21 inch.

The stand of dwarf milo obtained from the first planting on the rotation plats was so poor that it was necessary to re-plant all the plats. This was done on March 23 and 24. The dwarf milo in the rate-of-planting experiment was also planted the second time on March 25.

Sudan grass and sorghum for forage in both 4.1 ft. and 8-inch drills was planted in the rotation experiments the first part of the week.

Teparies, California Pink, and Navy beans were planted on A3 in a test to determine the value of the tepary in comparison with the more common table beans.

A field planting of sorghum for forage was made on the low ground in Field A3.

Fifteen rows of corn were planted on Field B4. Five rows are the regular distance of 4 feet, and the other 10 rows are 6 feet apart. Later on cowpeas will be planted between five of the rows left 6 feet apart. This test was started to determine the difference in yield of corn from these different methods of planting, especially inasmuch as the planting of cowpeas between the rows of corn is being advocated by some for this section.

Much difficulty has been experienced in securing a stand of corn in the San Antonio region this year, due to the cold weather following planting time and to the meadow larks. It has been necessary to watch the birds on the experiment farm in the early morning and late afternoon during the time the second planting of milo is coming up, in order to secure a uniform stand on the various plats in both the rotation experiments and the rate-of-planting experiment.

The oats on the farm are beginning to head and are looking extremely well. The yield promises to be unusually good this year.

During the week ending April 4 the maximum temperature was 82, minimum 51; greatest daily range, 23. Rain fell on two days, which prevented field work a part of the week. The total precipitation for the week was 2.02 inches.

11 April, 1914.

FIELD NOTES.

San Antonio (continued).

The farm roads were graded the first part of the week.

Fields C5, C4, and D3 were gone over with the orchard cultivator to remove the Johnson grass, preparatory to planting cotton.

The rotation plats were weeded.

Cotton on all the rotation plats was planted April 2.

Planting of the cotton thinning experiments and other cotton for the Office of Crop Acclimatization and Adaptation Investigations was started, but this work was stopped by rain.

Nearly 2 inches of rain fell on the afternoon of April 3. The rain came rather rapidly and packed the soil considerably. It is hoped, however, that the cotton just planted may be able to get through the crust formed.

Messrs. Meade and McKeever arrived at the station on March 28, and Messrs. Kerr and Taylor on April 4.

Belle Fourche.

The maximum temperature during the week of April 4 was 60, minimum 28; precipitation, 0.09 inch.

Field work was commenced March 31.

The plowing for the grain in the dry land rotations was completed.

All plats to be planted to grain were double disked and harrowed, and the staking of plats was commenced.

In the irrigated rotations all the plats that were in potatoes, corn, and beets in 1913, and not plowed, were double disked, and leveling was commenced.

The garden was manured during the week and the hot bed made and planted.

The manuring of alfalfa on Field K was completed.

Pruning of irrigated forestry was commenced.

The ground for the irrigated orchard and small fruit was spring toothed.

All the trees came through the winter without winter killing except the jack pine and bull pine. The bull pine is in very much better condition than the jack pine. It is too early yet to make an estimate on the extent of winter killing.

11 April, 1914.

FIELD NOTES.

Belle Fourche (continued).

The winter wheat is in very good condition, both on the dry and irrigated plats. There was considerable blowing on the summer fallowed winter wheat, but not enough to do any serious damage as far as stand is concerned.

The soil is in excellent condition and there is enough moisture to start all crops.

The repairing of the mess house is very nearly completed.

Yuma.

During the week ending March 14 the maximum temperature was 90, minimum 42; greatest daily range, 49.

The clearing on the south of the B series was completed and similar work begun on E series.

Fields D18, 23 to 26 were retouched, dragged, and put in condition for seeding alfalfa.

Alfalfa fields E-1 to 6 were clipped and subdivided into 1/4 acre plats by plowing borders, in preparation for establishing a time-of-cutting experiment on this series. Stand counts were also made of each plat.

Brush was hauled from deciduous orchard B25 to 30, and fig orchard C8 to 17.

Field B25 to 32 was furrowed and irrigated;
Also pomegranates on C18.

A number of cuttings of *Populus* species were placed for rooting in nursery A101.

Four varieties of figs were transplanted from A131 nursery to C14;

Also several pomegranates propagated in the nursery to C18.

The following trees have been received from the Armstrong Nurseries, Ontario, Cal., and planted to orchard positions on B25 to 32, to add to varieties already established:

Fruit	Number of varieties	Number of trees
Pears	7	14
Apples	3	6
Quinces	1	2
Crab apples	1	4

11 April, 1914.

FIELD NOTES.

Yuma (continued).

Fruit.	Number of varieties	Number of trees
Apricots	4	10
Peaches	3	6
Plums	7	14
Prunes	3	6
Almonds	2	8
Walnuts	3	6

Cantaloupe plantings of Rocky Ford and Emerald Gem varieties were made on borders A12₃ and A15₁.

During the week of March 21 the maximum temperature was 96, minimum 43; greatest daily range 48.

Fields D20 to 22 were prepared for seeding alfalfa.

Fields D18, 20 to 26 were seeded to Peruvian alfalfa to be carried in a time-of-cutting experiment,

Two outside teams were employed for five days hauling gravel. Gravel was screened, the finer portion being used for surfacing the tennic court and the coarser for concrete work.

Fig orchard C6 to 17 was furrowed and irrigated.

Row plantings of alfalfa on borders C42 to 45 were clipped and renovated.

The extension to the machine shed was completed.

Various plantings of ornamentals were made about the grounds. In most cases the sand was removed and heavier soil and manure supplied to insure a better start for these trees and shrubs. Seventy-five plants, representing 35 species and varieties, were planted, including both evergreen and deciduous sorts. Twelve trees and climbing roses were secured from California nurseries and placed on the grounds. Along with these ornamentals there have been received from the Washington greenhouse 103 small rose plants, including 13 varieties, chiefly everblooming teas and hybrid teas, and 104 chrysanthemums, comprising 64 varieties. The rose plants will be carried through this season in the nursery A104, while the chrysanthemums are being held in pots for several weeks. Both the rose and chrysanthemum seem particularly well adapted for open plantings here, but perhaps much should be found out as to best varieties to endure the intense summer heat.

11 April, 1914.

FIELD NOTES.

Yuma (continued).

Canna plantings were made during the week, five new varieties being added to the collection.

Thirty-five mulberry cuttings of six different sorts were placed in nursery rows on A101.

Two hundred plants of bush fruits were planted to A106, including 14 varieties of blackberries, dewberries, Loganberries, raspberries, etc.

Sixteen trees of common Adriatic fig varieties were secured from an Imperial Valley nurseryman and added to the fig plantings on C16.

Forty grape vines representing 9 varieties were added to the grape variety test on A156.

Four additional varieties of potatoes were planted on D16.

Five varieties of casabas were planted on A9.

Truckee-Carson.

The maximum temperature during the week ending March 28 was 78, minimum 21.

To Plat Y15 was applied 19.4 tons manure and 23.4 tons to Y1.

Fields S; part of N, C11 to 24 and all of E were irrigated.

The following grain varieties have been received and are to be planted the following week in the Stillwater district. The barleys will be grown by W. A. Van Voorhis and the oats and wheat varieties by L. W. Langford.

Truckee-Carson Experiment Farm, 1914.

2274-Swan Neck Barley.

Office of Cereal Investigations.

2528, Early Mountain Oats, C.I.656; 2564, Dicklow wheat; 2565, Washington Bluestem Wheat; 2566, Little Club Wheat; 2567, Mariout Barley; 2568, White Moravian Barley; 2569, Svanhals Barley; 2570, White Russian Oats.

Nevada Experiment Station.

2572, Marquis Wheat; 2573, Defiance Wheat; 2574, Oderbrucker Barley; 2575, Mancheuri Barley; 2576, Chevelieri Barley; 2577, Swedish Select Barley; 2578, American Banner Barley; 2579, Abundance Barley.

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LEADING AGRICULTURAL COUNTIES.

Under the above heading, the "Breeders' Gazette" for March 26, 1914 (page 716) contains the following paragraph:

"According to Director William J. Harris, of the Bureau of Census of the Department of Commerce, Los Angeles Co., Cal., of all the 2,950 counties of the United States, takes first place in value of its crops. The ranking of the first eight agricultural counties, together with the value of the crops raised, follows: Los Angeles Co., Cal., \$14,720,900 for fruits, hay and forage, live stock, dairy products, and vegetables; Lancaster Co., Pa., \$13,059,000 for corn, wheat, oats, live stock, and dairy products; McLean Co., Ill., \$12,811,500 for corn, wheat, oats, and cereals; Whitman Co., Wash., \$12,540,700 for corn, wheat, oats, and cereals; Livingston Co., Ill., \$11,377,300 for corn, wheat, oats, and cereals; Iroquois Co., Ill., \$10,607,800 for corn, wheat, oats, and cereals; La Salle Co., Ill., \$10,322,200 for corn, wheat, oats, and cereals; Aroostook Co., Me., \$10,151,000 for potatoes and vegetables. The total valuation of the crops in these eight counties was \$95,491,000, or about 2 per cent of the \$5,487,161,000 valuation for all the crops raised in the United States. The figures for Los Angeles Co., Cal., show that the total value of the crops raised there averaged \$35 per acre and \$29 per capita (the city of Los Angeles, with a population of 320,000, is in this county); for Lancaster Co., Pa., \$38 per acre and \$78 per capita; for McLean Co., Ill., \$18 per acre and \$188 per capita; for Whitman Co., Wash., \$14 per acre and \$377 per capita; for Livingston Co., Ill., \$18 per acre and \$381 per capita; for Iroquois Co., Ill., \$16 per acre and \$298 per capita; for La Salle Co., Ill., \$17 per acre and \$113 per capita; and for Aroostook Co., Me., \$23 per acre and \$136 per capita. The corresponding figures (at the farm) for the United States for the same year were \$16 per acre and \$60 per capita."

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Leading Agricultural Counties (continued).

It would be interesting, if it were possible, to compare these figures with similar data relating to the irrigated lands. Because of the varying and frequently unsatisfactory methods of collecting crop statistics, it is doubtful whether a reliable comparison can be made with the figures available. It is certain that crop statistics frequently fail to indicate actual conditions, particularly when it is desired to know the degree of prosperity obtaining in an agricultural region. It is entirely possible, for example, that the farmers of Whitman County, Washington, where the value of crops is reported as \$14 per acre, are making a higher rate of interest on their investment than are the farmers in Los Angeles County, California, where the value of crops was \$35 per acre. The above figures do not include the cost of producing the crops.

If any of the field men wish to try to make some comparisons, they will find some figures relating to six Reclamation projects in the Weekly Bulletin for March 28, 1914.

F.D.F.

APPOINTMENTS.

It is suggested that, if possible, the full name of the appointee should always be given in requesting appointment. Several instances recently of changes in appointments, necessitated by discrepancies in names, call attention to the desirability of care in this direction.

OSBORN (MONT.) POST OFFICE,
Discontinuance of.

On April 15 the post office at Osborn, Mont., was discontinued. Mail for the Huntley Experiment Farm should now be addressed to Huntley, R. F. D.

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PUBLICATIONS.

During the past ten days the following manuscripts have been submitted for publication:

The Work of the Belle Fourche Experiment Farm in 1913, by Mr. Aune.

The Work of the Umatilla Experiment Farm in 1913, by Mr. Allen.

The Effect of Fallowing Land at San Antonio, by Mr. Letteer.

Alkali Land Reclamation on the Huntley Project, by Mr. Hansen.

It is expected that the farm reports will be published as unnumbered circulars, and the other papers as Department bulletins.

FIELD NOTES.

Umatilla.

During the week ending April 4 the maximum temperature was 69, minimum 30; rainfall 0.03".

Work was completed on replacing the pipe lines to cover land leveled by filling in the north line canal.

Fields D4 (sweet clover), B5 (the vineyard), C1d (hog pasture), C1d (alfalfa), in the same experiment, were irrigated.

A Cippoletti weir was made to measure the water for the irrigation experiment on field Blb, and the experiment was started. The field is divided into three plats, each containing 1/5 acre. Plat "a" is to be irrigated twice to each crop and no more, unless plants begin to wither. Plat "b" is to be irrigated every 12 days, and plat "c" every 6 days. The hay is to be cut before second growth sets in and weighed green.

18 April, 1914.

FIELD NOTES.

Huntley.

During the week of April 4 the spring plowed sod on dry land was disked and all of the fall plowing and alfalfa on the irrigated part of the farm was harrowed. The soil is in excellent condition of seeding, being well supplied with moisture.

Construction of the fence around the dry land tract was completed.

Following are the ground-water levels in Field M-II, well No. A-#, since December 15, 1913:

Date.	Depth to ground-water (feet)
12/15/13	3.41
1/2/14	3.45
1/16/14	3.34
2/1/14	3.70
2/14/14	3.96
3/2/14	3.39
3/14/14	3.74
3/28/14	2.60

Mr. John W. Knorr arrived at the farm on April 5, to take charge of the irrigation rotation work.

No field work could be done during the early part of the week of April 11, because of a light fall of snow.

During the latter part of the week the preparation of the land for seeding on the part of the dry land tract broken up this spring has been completed.

Wheat has been planted in the dry land rotations.

The plats in the pasture grass test in Series A-II have been prepared for planting.

All of the grass seed and seed corn for the variety test have been received.

A large amount of seed grain has been distributed in small lots among the farmers on the project.

18 April, 1914.

FIELD NOTES.

Huntley (continued).

The potatoes are being taken out of the pit and sorted for market. Potatoes are selling at about 75 cents per cwt.

Mr. J. S. Cole visited the station April 11.

Scottsbluff.

With the exception of a light snow storm on Thursday, the weather during the week of April 4 was such as to permit of field work.

The foundation for the dairy barn has been put in and it is hoped that the work of construction can be begun during the coming week.

A water tower 12 feet high is also being built. This will give a water pressure at the hog house and the pasture where it is intended to keep the cows.

Series 3 on Field G was backset in preparation for potato planting.

Series 5 and 6, Field G, were disked and seeded to spring varieties.

The dry land wheat was seeded April 3 and harrowed.

Fencing of the alfalfa for the hog pasture was begun.

All the pasture grasses planted last year are doing very well. Kentucky bluegrass was the first to start growth this spring. It was followed by red top, brome grass, and timothy, in the order named.

Truckee-Carson.

During the week ending April 4 the maximum temperature was 72, minimum 22.

The following fields were irrigated: D-12 and 13; F-1, 2, 6, 9, 10, 11, 14, 15, 16, 17, 18,

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FIELD NOTES.

Truckee-Carson (continued).

19, 20, 21, 22, 23, 24, 25, 26, 27.

Newly planted trees in nursery were also irrigated.

Twenty-three tons of manure were hauled to Y-3.

The following varieties of wheat and oats were planted on the farm of L. W. Langford, near Stillwater: Wheat: Spencer, Little Club, Dicklow, Washington Bluestem, Marquis, Defiance. Oats: Swedish Select, Early Mountain, Abundance, White Russian, American Banner, Spencer.

The Spencer wheat and Spencer oats are varieties which were grown near Stillwater.

The following varieties of barley were planted on the Indian School farm: Oderbrucker, New Zealand, Manchuri, Swan Neck, Mariout, White Moravian, Svanhals.

The following trees, received from the German Nurseries, were planted in fields S and N: White ash, white birch, black locust, box elder, European alder, white elm, hackberry, horse chestnut, German linden, American linden, soft maple, European mountain ash, Siberian pea tree, American sycamore, Norway maple, golden poplar, Bolena poplar, Cistena purpurea, laurel leaved willow, arbor vitae, European larch, Tamarix odessa, Japanese quince.

Belle Fourche.

During the week of April 11 the maximum temperature was 68, minimum 8.

Oats, wheat, and barley were seeded in the dry land rotations.

All plats in irrigated rotations except alfalfa, clover, winter wheat, and plat AI-40, were leveled and harrowed.

Series I, II, III, and IV in Field P, for the fall irrigation experiments, were double disked, and F-III and E-I was doubled disked

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FIELD NOTES.

Belle Fourche (continued).

and harrowed, and F-I was harrowed.

Plowing on Field I was completed, and I and K were leveled once.

Five hundred honey locust were planted in irrigated forestry, and 500 bull pine transplants have been received and will be planted next week.

Mr. E. M. Johnston, of Beaumont, Texas, arrived Friday, to take charge of the cereal work for the Office of Cereal Investigations.

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HOGS ON ALFALFA PASTURE AT NORTH PLATTE, NEBRASKA.

In connection with the alfalfa pasturing experiment summarized in the Weekly Bulletin, Vol. V, p. 56, there is given herewith a tabular statement of some results obtained on the North Platte, Nebraska, Experiment Farm, in 1908, reported in Bulletin 123 of the Nebraska Station, issued February 22, 1912.

On pages 34 to 37 of that bulletin the details of that experiment are given, and from these data Mr. Holden has prepared the following table, using the same methods and the same basic prices, i. e., 7 cents per pound live weight and 1 cent per pound for corn, as were used in the summary in the Weekly Bulletin above referred to.

NORTH PLATTE.
Experiment No. 28.

Lot No.	Days	Number of hogs	Initial weight	% Daily gain	Total gain per day	Profit	
						From alfalfa	Total Per day
88	56	14	2,072	.75	19.18	\$33.18	\$0.59
89	76	14	2,058	.59	14.28	39.06	0.51
90A	76	14	1,946	.34	7.28	38.73	0.50
90B	35	14	2,499	.70	18.48	19.07	0.57

The grain rations fed to the several lots were different in each case: Lot 88 was fed 2.91 pounds of corn per day per 100 pounds of live weight during the experiment from April 25 to June 20. The average initial weight was 148 pounds and the average final weight 225 pounds. The grain ration fed to Lot 89 was 1.9 pounds per day per 100 pounds live weight, during the experiment from April 25 to July 11. The average initial weight was 147 pounds, the

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Hogs on Alfalfa (continued).

average final weight 225 pounds. Lot 90A was fed no grain from April 25 to July 11. From July 11 to August 15 the same lot listed in the table as Lot 90B was fed 3.1 pounds of corn per day per 100 pounds live weight. The average initial weight of Lot 90A was 139 pounds, and the average final weight 178.5 pounds. The same weight, of course, applies to the initial weight of Lot 90B, and the final weight of this lot was 225 pounds.

The purpose of the North Platte experiment was slightly different from that at our field stations, being to determine the method by which to secure the greatest efficiency of corn, rather than to use alfalfa most advantageously. However, a comparison between the two sets of experiments, particularly as regards percentage daily gain and profit per day from alfalfa, can apparently be made fairly. Based on our results it seems fair to assume that each lot of hogs at North Platte could have been carried on one acre. In other words, three acres should have been sufficient to carry the three lots.

A more direct comparison of these two sets of experiments may be made by using the results from Lot 1 at Scottsbluff and Lot 89 at North Platte. These two lots were on pasture during the same season of the year and were fed approximately the same grain ration. The following table shows this comparison in regard to a number of points and shows also that the Scottsbluff results were distinctly better than those obtained at North Platte.

	Lot 1 Scotts- bluff	Lot 89 North Platte
Days on pasture.....	61	76
Average initial weight..... pounds	109	147
Average final weight..... do	185	225
Average mean weight..... do	147	186
Total gain..... do	76	78
Average daily gain..... do	1.25	1.02
Per cent. daily gain..... do	0.86	0.59
Grain for 100 pounds gain..... do	275	346
Cost of grain for 100 lbs. gain (60¢ corn) ... \$2.95		\$3.71
Profit on 100 lbs. gain ($7\frac{1}{2}$ ¢ hogs) \$4.55		\$3.79

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EXPRESS.

The Office of Records requests that farm superintendents be cautioned that express shipments should not be made on freight bills of lading, as is sometimes done. Payments for express shipments may be made by the farm superintendents on Form 5 vouchers (omitting number of authorization) or on bills submitted by the express companies direct to the Bureau, and bills of lading are not necessary.

FIELD NOTES.

Truckee-Carson.

During the week ending April 11 the maximum temperature was 68, minimum 30.

The variety tests of garden beets, parsnips, turnips, carrots, radishes, and lettuce were planted in N5 and 6.

Twenty-two tons of manure were hauled to Y4. This completes the manuring of the plots of this series.

Mr. Headley left Fallon on the 6th to attend the Irrigation Conference at Denver.

Belle Fourche.

During the week ending April 11 the maximum temperature was 78, minimum 26.

The seeding of wheat, oats, and barley in irrigated rotations was completed.

The oat and wheat varieties on dry land were planted.

Six hundred bull pines were planted in the irrigated nursery.

The leveling and harrowing in field I and K and O and P have been completed.

The dry alfalfa in field C was renovated; also the alfalfa in field K was manured.

25 April, 1914.

FIELD NOTES.

San Antonio.

During the week ending April 11 the maximum temperature was 85, minimum 32; greatest daily range, 40.5.

Although the thermometer recorded a minimum of 32 on the morning of April 9, only a very light frost occurred at the Experiment Farm. Practically no damage was done at the farm, but it is reported that considerable damage was done to crops in some areas in the vicinity of San Antonio.

After the rains of the previous week all fallow land was harrowed.

All of the corn and the orchards were cultivated.

Cotton planting was continued, and was finished on field D3 and the Hervst field.

On account of the damage by the rain to the young milo plants and the resulting poor stand in the thinning experiments, the ground was harrowed and the milo again planted April 11.

The stand of cotton on the rotation plats promises to be so poor that it has been decided to replant it, and this will be done as soon as the seed arrives. The poor stand resulted from seed of low vitality and unfavorable conditions after planting.

During the week of April 18 the maximum temperature was 91, minimum 40; greatest daily range, 45. The total precipitation for the week was 0.06 inch.

The row sorghum in the rotation plats was cultivated.

The variety test of beans on A3 was cultivated.

The cotton plats in the rotation experiments were harrowed and the cotton replanted on April 15 and 16.

The thinning experiment of cotton was also replanted.

25 April, 1914.

FIELD NOTES.

San Antonio (continued).

Cotton planting on the farm was completed for the season.

A small plat of Chinese corn for seed was planted on AB8.

All of the corn on the rotation plats was thinned, and thinning of corn in the variety tests was started. The corn was cultivated following thinning.

The volunteer oats and weeds on field B6 were cut, in preparation for plowing this field.

The oats on the farm are being attacked by rust. The yield of the later planted oats and those heavily pastured in the pasturing experiment will be materially reduced by rust.

Scottsbluff.

With the exception of two days, the weather during the week of April 11 was such that field operations were carried on in good shape.

Series 1, Field G, was backset for potatoes.

Series 3, Field A, was plowed and put in shape for small grain.

The fence was removed from around the hog pasture on the north end of Series 4-5, Field C was taken away and the alfalfa is being crowned, preparatory to planting corn for the hogging-off experiment. The last two plats of the crowning alfalfa experiment were finished Friday.

In the crowning of the alfalfa it was found that when the alfalfa made the first growth about three weeks previous the crowning was done much more easily than at any other time. The fall crowning required the greatest draft, and the early spring plowing the least.

All of the spring wheat was seeded on field C, and was put in in good shape.

One thousand red cedar trees, about 1,000



25 April, 1914.

FIELD NOTES.

Scottsbluff (continued).

arbor-vitae, 500 ash, and 500 cottonwood were planted. A number of other trees and shrubs were set out about the buildings.

The weather during the week of April 18 was rather blustery. Friday and Saturday there was a total rainfall of 1.15 inches.

The land on Field K has been put in shape for seeding oats.

At odd times the work on the construction of the fence on Field K for hog pasture work has been continued.

The barley varieties were seeded April 14, on Series 5, Field G.

The land for the oat varieties has been put in shape and is ready for seeding as soon as the soil is dry enough.

Series 2, Fields C-G, containing the alfalfa eradication experiment was backset and is being put in shape for seeding. The ten plats containing A-B-C-D-E under the heading "Plowing" do not show any great difference so far as the decay of the crowns is concerned. The only apparent difference is that where the second crop has been plowed under there has been considerably more growth than on those plats where the third crop was plowed under. Under heading No. 2, "Crowning", plats B-D, the crowns have made considerable growth.

The following general observations have been made today (April 18):

It required less power to crown the alfalfa in the spring. Should fall crowning be resorted to, the land should not be plowed until spring. When the crowning is done in the spring, it should be done fully three weeks before the land is ready to be plowed for beets. We draw this conclusion from paragraph C-D. Also, this paragraph states that plowing should take place three weeks after crowning. This could not be done



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FIELD NOTES.

Scottsbluff (continued).

under prevailing conditions, as the alfalfa did not start growth early enough in the season. Delaying the plowing would make the planting season too late. We believe that many crowns of the late crowning will make a growth. One plat of alfalfa was not crowned, but merely turned under to the same depth as the crowned plats. It required much more power to turn this under than where the alfalfa was crowned. We did not think that the draft would be lessened as much as it was by 2-inch crowning.

Huntley.

During the week of April 18 weather conditions were favorable for field work.

Field M-II and the north part of Field M-I have been harrowed.

The ground-water on the south part of Field M-I is so near the surface as to make it impossible to work the ground. Following are the water levels in the Worden wells on April 15.

Well No.	Depth to ground water. (feet)	Difference since last reading.
A-1	1.80	.26 fall
A-2	2.06	.22 do
A-3	2.40	.20 rise
B-1	2.56	.01 fall
B-2	2.48	.04 rise

Five plats of wheat were planted in Field K. One 1/20-acre plat of each of the following grasses was planted in Field A-II: Kentucky blue-grass, western wheat grass, timothy, and red top.

25 April, 1914.

FIELD NOTES.

Huntley (continued).

A number of elms and boxelder from the forestry plat have been set out in the grounds about the buildings. A number of these trees and also seed potatoes of the Rural New Yorker variety are being distributed among the farmers on this project.

Prof. Alfred Atkinson, of Bozeman, visited the station Monday.

Yuma.

During the week ending March 28 the maximum temperature was 87, minimum 43; greatest daily range, 43.

Borders D6 to 15 were prepared for planting.

Fourteen selections of flax were planted in a variety block on A10-4.

Fig orchards C8 to 17 were furrowed and given the first irrigation of the season.

Eight peach trees were received from the Office of Seed and Plant Introduction and planted in orchard on B.

Pumpkin and squash plantings were made on A12-3.

Tomatoes and eggplants were transplanted to garden.

A stand count of plants was made on all plats of alfalfa on E field 1 to 6. From 32 counts averaged of each seeding rate the following stands are indicated:

Peruvian, 12 lbs. per acre, 399,625 plants per acre.

do 15 " " " 394,875 " " "

Chilian 18 " " " 349,000 " " "

This alfalfa was seeded in March, 1913, under favorable conditions, and from these figures it would seem that 12 pounds per acre is a better seeding rate than a higher.

Early melon plantings about the valley are growing rapidly. Several planters practiced planting hills beneath oiled paper to force early growth and guard against frost.

25 April, 1914.

FIELD NOTES.

Yuma (continued).

Sufficient Durango cotton seed has been purchased to plant 600 acres on the Yuma Project.

The first cutting of alfalfa is quite generally being made this week.

On Saturday night a very heavy rain fell, accompanied by a little hail. The rain amounted to 0.97 inch. The hail damaged grape vintes, apricot fruit, and some grain to a slight extent.

Mr. Rowland McKee of the Forage Crop Office visited the Station Monday and Tuesday.

During the week ending April 4 the maximum temperature was 93, minimum 40.

The following plantings were made: Sugar cane, A10-5; Peruvian alfalfa, C41; Hemp (for fiber), C20; Hemp (for seed-4 selections), C21 and 22; Sudan Grass (seeding date test), C23.

Volunteering cotton plantings on A5 were uncovered and irrigated.

Alfalfa, first cutting, was harvested from C27 and 28.

Hay cutting of alfalfa and nurse crops were taken from borders A-13627.

The following comparison was shown in stand counts with the various nurse crops:

	Grain	Alfalfa.
Alfalfa, 12 lbs. acre and bearded barley, 56 lbs. acre.....	286,400	466,000
Alfalfa, 12 lbs. acre and Sonora wheat, 46 lbs. acre.....	276,000	458,000
Alfalfa, 12 lbs. acre and Apples Rust-Proof oats, 35 lbs. acre....	252,000	350,000

Fig orchard C8 to 17 was summer pruned. Seventeen fig trees, representing 8 varieties of the Adriatic sorts, were planted to C16. Two apricots and 6 Japanese persimmons were planted to B

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FIELD NOTES.

Yuma (continued).

orchard.

Thirteen species of *Salix* and *Populus* were planted in duplicate on D45.

Thirteen ornamentals were added to ground plantings.

Seventeen species of ornamentals and promising indigenous shrubs and trees of the Southwest were planted on A-13-3.

Also 153 plants of various species were placed in nursery rows on A104.

A railroad is being constructed by the Reclamation Service along the levee extending into the lower Yuma Valley. It is expected that this will be completed in 60 days. This railroad will have considerable bearing on the agricultural development of the lower Yuma Valley.

Mr. G. P. Rixford, of the Office of Crop Physiology, visited the station Saturday.

During the week ending April 11 the maximum temperature was 92, minimum 50; greatest daily range, 42.

Field plantings were made as follows: Durango cotton, D13 and 15; Sudan grass, C25 and 26; Feterita, D44.

On team leveled on the A series.

Orchards and nurseries were cultivated.

Three men were employed during the week in hoeing weeds and grass from the orchard on B and from roads and ditches.

A *Legustrum* hedge was planted on the grounds.

Also 14 everblooming roses were received and beeded.

2 May, 1914.

DEMONSTRATION WORK ON THE NORTH PLATTE PROJECT.

In accordance with the arrangement noted in the Weekly Bulletin of March 21, demonstration work in hog raising on the North Platte Project began May 1, when Charles S. Jones, of the Bureau of Animal Industry, reported for duty. In view of the conditions on the project, it has seemed desirable that the hog industry be taken up first. This industry provides an excellent method of disposing of a large part of the principal crop products of the project, and it is further desirable because of the relatively small capital required and the quick returns which can be realized. Mr. Jones' activities will for the present be devoted entirely to the establishment of the hog industry. It is expected that other related industries will be taken up later.

There are already a number of farmers on the project who are engaged in hog raising. In 1913 there were something over 14,000 hogs on the project. These will serve as a nucleus on which to begin the general campaign. One of the evidences that the assistance of an expert is needed is the fact that about 1,000 hogs died of disease in 1913. One of the first things to be taken up this year will be the eradication of any diseases which may be present, in order that the industry may be placed on a safe basis.

It is expected that on July 1 this demonstration work will be taken over by the proposed Office of Demonstrations on Reclamation Projects, for which Congress has been asked to appropriate \$50,000.

PAY ROLLS.

It is requested that in making up the field pay rolls the date of appointment be given, rather than the time it takes effect.



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FIELD NOTES.

Scottsbluff.

Week ending April 25:

On April 23 there was a rain of 0.8 inch. This fell during the night and the greater portion of the day, and there was practically no run-off. This makes a total of 1.85 inches of rain so far this month.

The soil is in excellent condition for the starting of all crops.

The alfalfa is farther along this year than in any past year at the same date.

Oats have been seeded on field K, and the land has been put in shape for the seeding of sugar beets.

Series 4, Field B, has been planted to sugar beets, and the remainder of the soil is in shape for seedings as soon as it becomes dry enough.

The spring wheat is up on the dry land as well as on the irrigated land.

All of the dry land crops are growing nicely, and the soil on the dry land is in excellent condition.

Several bankers of Scottsbluff have consulted with Mr. Knorr on several occasions in regard to purchasing dairy cows for the farmers in the vicinity of Scottsbluff and Mitchell. He has given them all the available literature that has been received by him in reference to purchasing cows by interested parties for the farmers. All indications are that by this fall some dairy cows will be put on the project.

On Wednesday and Thursday the North Platte Valley Conservation Congress met at Scottsbluff, and one of the main topics discussed was, "What shall the farmers grow when the sugar factory closes down?" Live stock and more especially the dairy cows will have to replace the beets to a large extent, and many of the farmers are looking forward to this kind of work.



3 May, 1914.

FIELD NOTES.

Belle Fourche.

During the week ending April 25 the maximum temperature was 72, minimum 38; precipitation, 0.73 inch.

The planting of the grain varieties was completed, both on the dry and irrigated ground.

The part of the fields I and K north of the Calhoun lateral was planted to oats, and the oats in the time-of-breaking experiment were planted in Field D.

About 1,500 cottonwoods were planted in the irrigated forestry. The trees are of native stock from Horse Creek.

One hundred white elms and 350 strawberry plants of the following varieties: 50 Crescent, 50 Haverland, 100 Clyde, 50 Warfield, 50 Aroma, and 50 Dunlap, were received from the Huntley Experiment Farm.

Umatilla.

During the week ending April 25 the maximum temperature was 72, minimum 25; precipitation, 0.02 inch.

Fields C1, B2c, and D3 were irrigated.

Parts of C1, C2, and all of D5c were plowed.

The strawberries in A3b were hoed out and irrigated.

Asparagus in A2 was cultivated.

All fruit trees having green aphid were sprayed with Black Leaf 40.

Green aphid has become so abundant on fields of alfalfa on the Umatilla and neighboring projects that its growth has been checked for several days, and since cool weather prevails the first crop will need to be cut to get rid of them.

Peach trees not receiving prompt attention are badly damaged by the aphid, and it appears that some will be entirely killed unless given proper attention.



2 May, 1914.

FIELD NOTES.

Umatilla (continued).

Assistant State Veterinarian Dr. S. S. Foster came up from Portland on April 19 and treated 120 head of hogs for cholera prevention. At the time cholera had made its appearance in two herds.

A temperature of 25 degrees on the night of April 20 destroyed practically all the apricots, pears, prunes, and cherries. It killed most varieties of peaches and destroyed practically all the apple and strawberry blossoms that were out. Apricot, crab apple, quince shoots, and the new growth on several trees in the nursery were killed. A light frost on the 25th destroyed what strawberry blossoms that had opened since the first frost. This will make the crop very light.

Truckee-Carson.

During the week ending April 18 the maximum temperature was 78, minimum 24.

Plats F22 to 28, inclusive, were plowed and leveled.

The following varieties of mangels were planted on Wingfield's Dairy Farm near Fallon: Giant Yellow Eckendorf, Giant Red Eckendorf, Crimson Tankard, Mammoth Golden Giant, Danish Sludstrup, Giant Golden Intermediate, Yellow Globe, Mammoth Long Red, Giant Feeding Sugar Beet.

Six trees of Pyrus Sp. S.P.I. No. 29050, were received and planted in N1.

San Antonio.

During the week ending April 25 the maximum temperature was 83, minimum 50; greatest daily range, 38.

A heavy rain fell Tuesday night and light



2 May, 1914.

FIELD NOTES.

San Antonio (continued).

showers fell later in the week. The total precipitation was 1.98 inches.

The remainder of the corn varieties were thinned and cultivated.

The nursery was weeded.

The cotton land on D3 was furrowed and partly irrigated, but the rain made irrigation unnecessary.

No field work was done the latter part of the week on account of the rain, which wet the ground to such an extent that field work was impossible.

The labor was employed in cleaning lots, repairing buildings, and working on the ground.

The cotton planted last week is coming up and the prospects are good for an excellent stand.

9 May, 1914.

PUBLICATIONS.

The following manuscripts have been submitted for publication during the past two weeks:

The Work of the Scottsbluff Experiment Farm in 1913, by Mr. Knorr.

The Work of the Truckee-Carson Experiment Farm in 1913, by Mr. Headley.

The Work of the San Antonio Experiment Farm in 1913, by Mr. Hastings.

The Work of the Huntley Experiment Farm in 1913, by Mr. Hansen.

FIELD NOTES.

Huntley.

During the week ending April 25 the plats in Field K for planting sugar beets, oats, and alfalfa were prepared for seeding.

No field work was done during the latter part of the week on account of rain.

The alfalfa plat in Rotation 67, which is to be used for hog pasture, has been fenced.

Of the separate grasses in the pasture grass test in Field A-II, tall oat and Bromus were the first to start growth in the spring, and are now high enough for good pasture. These were followed by orchard grass and meadow fescue. The rye grasses are just starting.

The following trees and shrubs have been planted in the grounds about the buildings:

10 green ash; 15 Carolina poplar; 5 basswood; 5 Colorado blue spruce; 10 Scotch pine; 10 mock orange; 15 lilac, improved; 15 Siberian dogwood; 15 hydrangea P. S.; 10 purple barberry; 20 Spirea Van Houte; 10 Spirea sorbifolia; 10 yellow currant; 2 European mountain ash; 10 Norway poplar; 10 Black Hills spruce; 5 white spruce; 5 bull pine; 15 Tartarian honeysuckle; H. B. cranberry; 15 common snowball; 5 Japanese barberry; 10 common barberry; 10 Spirea opulifolia; 10 Rosa rugosa.



9 May, 1914.

FIELD NOTES.

Huntley (continued).

Weather conditions during the week ending May 2 were favorable for field work during most of the time.

The plats in Field M-I and M-IA have been disked, harrowed, and leveled in preparation for planting.

Alfalfa on plats M-I-II and 15, planted in 1913, is making fair growth and has a good appearance, having apparently suffered no injury yet from the high water table under this tract.

In Field M-I good stands of winter rye and sweet clover have been secured.

The stand of winter wheat on Field M-I is rather light, although it is much better than on Field M-I-A, broken last season.

Following are the water levels on the Worden Tract on May 1:

Well Number	Depth to water (feet)	Difference since April 15. (feet)	
A-1	2.16	.36	fall
A-2	2.39	.33	"
A-3	2.87	.47	"
B-1	2.75	.19	"
B-2	2.76	.28	"

Work has been started by the Reclamation Service on the drain south of the Worden Tract, and this work is progressing rapidly. Two shifts are worked and about 400 to 500 feet of tile laid daily.

Plats A-II-1 and 2, each 1/4 acre, planted to grass mixtures in 1913, have been fenced to be used for a pasture test. Two cows were placed on these plats April 30.

The planting of alfalfa, oats, beets, and flax in Field K was completed.



9 May, 1914.

FIELD NOTES.

Huntley (continued).

A stand count of K-IV-22, alfalfa, continuous cropping, was taken. The stand received was 682,000, as compared with 805,000, the stand taken last fall.

Four Hampshire hogs, farrowed last September, were put on plat D of Rotation 67, on Monday of this week. Their total weight was 448 pounds; individual weight as follows:

No. 1 (gilt).....	98 lbs.
2 (gilt).....	110 "
3 (barrow).....	120 "
4 (barrow).....	120 "

Scottsbluff.

Practically no farm work was done during the week of May 2, on account of bad weather. There was a total of 1.29 inches precipitation during the week. This came as heavy showers and drizzling rains.

Six small hog houses and some fencing were constructed, and work was started on putting cement in the cow barn, which is now completed.

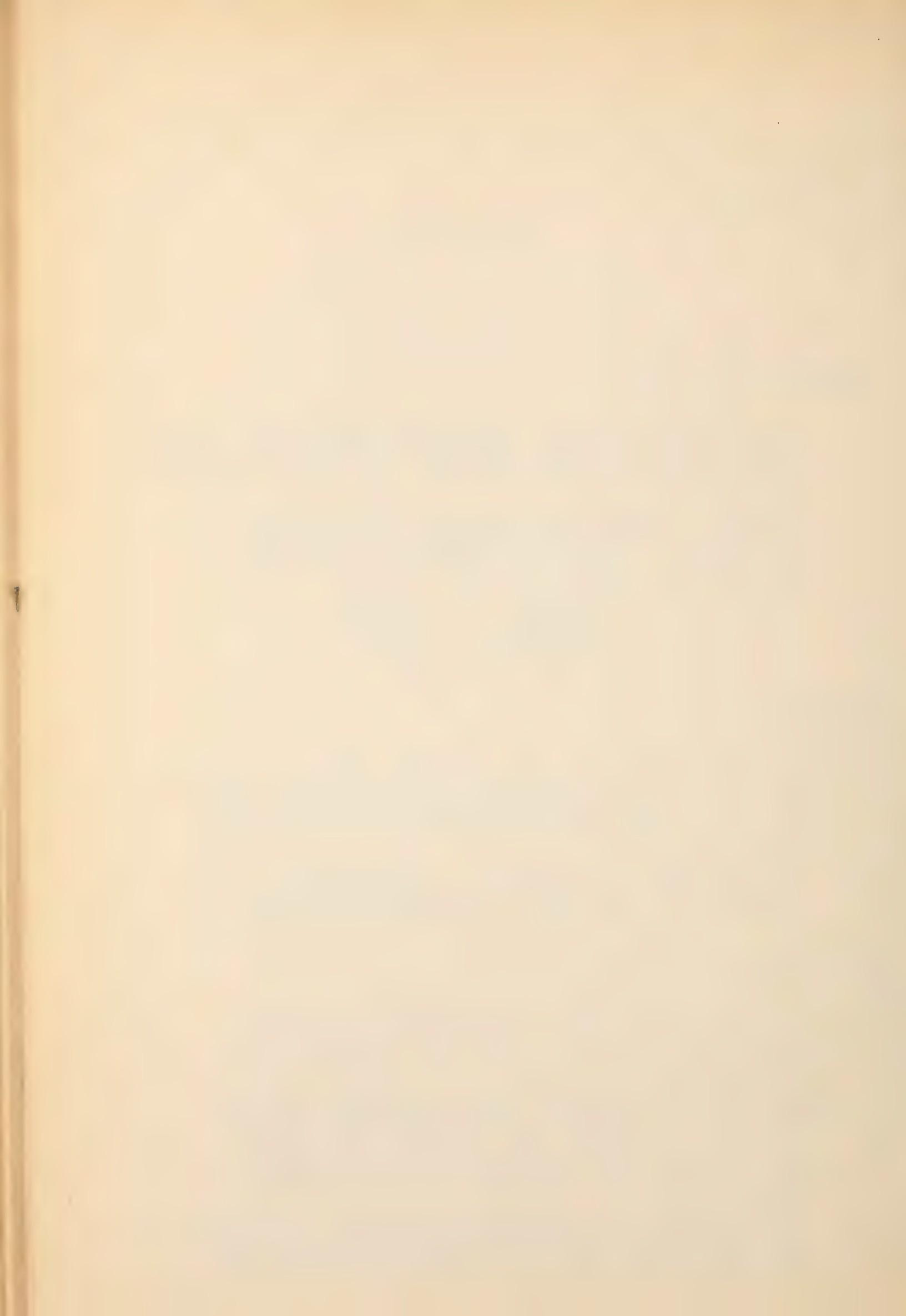
Belle Fourche.

During the week ending May 2 the maximum temperature was 65, minimum 36; precipitation, 0.22 inch.

All plowing for corn and potatoes in the dry land rotations has been completed, the same plats double disked, and the potatoes planted.

The potatoes in the irrigated rotations have been planted, and alfalfa was planted Saturday.

The oats were seeded on Field P. The work was interrupted to some extent by frequent showers nearly every day. The balance of the time



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9 May, 1914.

FIELD NOTES.

Belle Fourche (continued).

was spent in cleaning the irrigation ditches.

The wheat, oats, and barley were planted in the fall irrigation experiment during the week ending April 25.

San Antonio.

During the week ending May 2 the maximum temperature was 82, minimum 52.5; greatest daily range, 24.5; total precipitation, 2.36 inches.

The entire week was cloudy and rainy and no field work was done. It has been impossible to do any field work for nearly two weeks, on account of the wet weather, and the weeds are making rapid growth.

Oats are ready for cutting for hay, which will be done as soon as possible.

Corn, cotton, and all crops are making favorable growth.

Messrs. Meade and Kerr left on Thursday for Clarksville, Texas, where they are to plant cotton.

Mr. Cardon left for Tivoli, Texas, on the 21st.

Truckee-Carson.

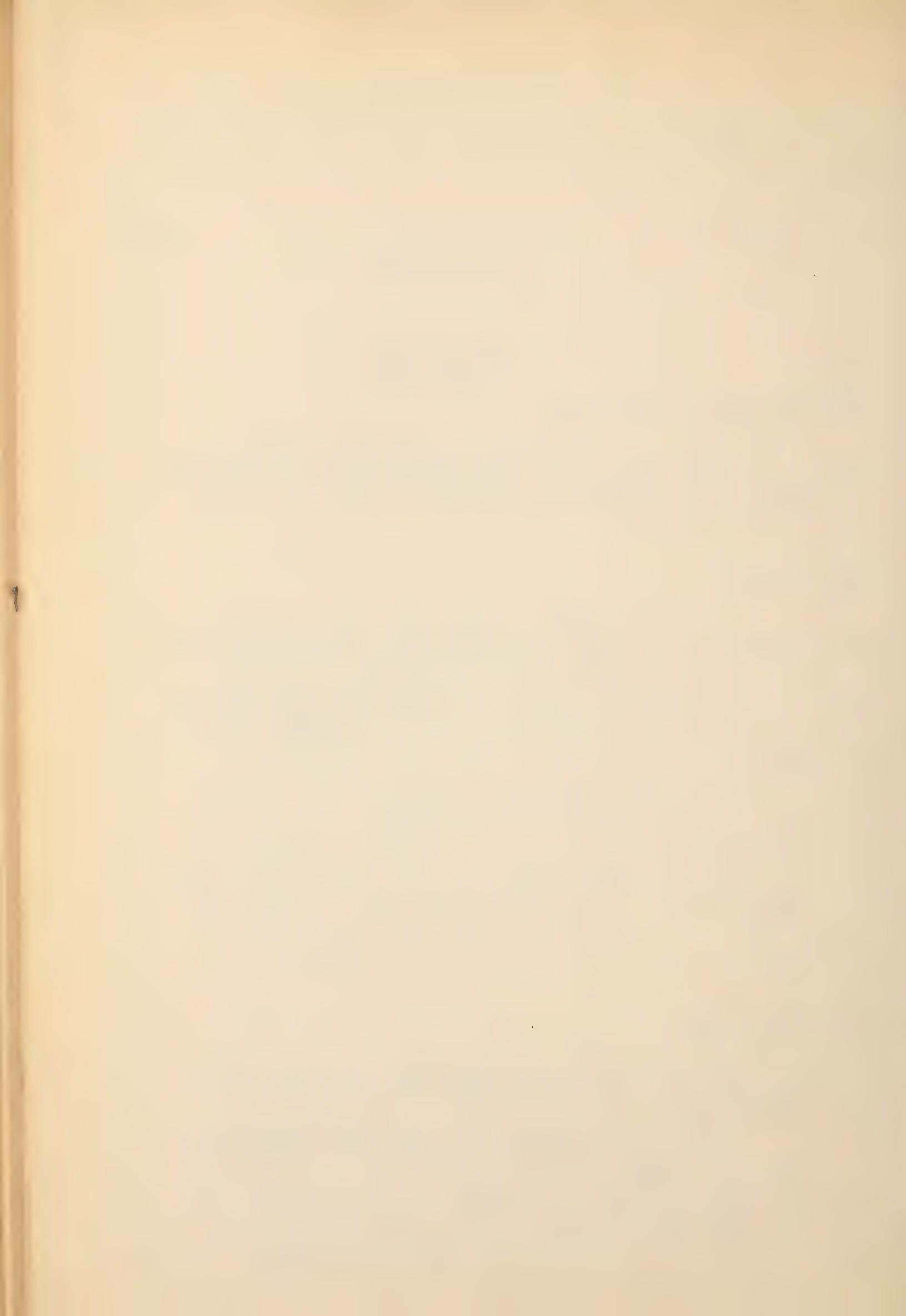
During the week ending April 25 the maximum temperature was 77, minimum 28; precipitation, 0.20 inch.

Plots F-22 to 28 were plowed and leveled.

A new set of irrigation boxes was placed in the "Y" series.

Fields D1 to 13 and E1, 2, 3, 4, 9, 10, and 11 were irrigated.

Fields A and C1 to 10 were cultivated.



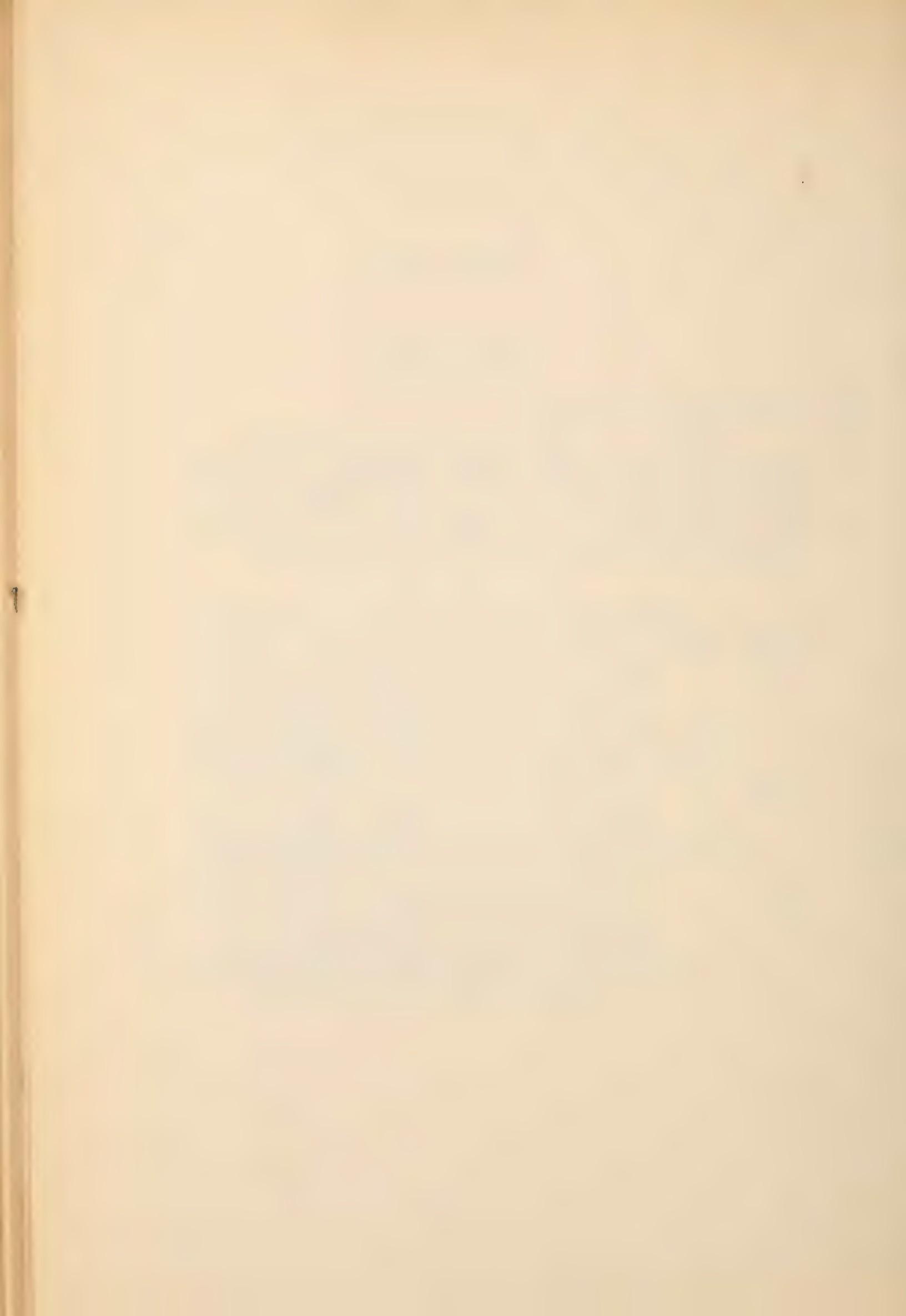
9 May, 1914.

FIELD NOTES.

Truckee-Carson (continued).

Analyses of soil samples from three plats on the "Y" series showed the presence of soluble salts as indicated below. Ten borings, each 3 feet deep, were made on each plat, on March 4. The figures below state, in percentages, the average of 10 borings in each case.

Plat	Depth	Total salts	Na_2CO_3	NaHCO_3	NaCl	Na_2SO_4
Y-21	1	0.6116	0.0124	0.0481	0.1076	0.2925
	2	0.5576	0.0278	0.0402	0.1112	0.2653
	3	0.3310	0.0376	0.0290	0.0473	0.1005
	Average	0.4850	0.0259	0.0395	0.0868	0.2198
Y-22	1	0.8472	0.0198	0.0703	0.1613	0.4080
	2	0.7784	0.0197	0.0607	0.1729	0.3860
	3	0.5232	0.0328	0.0523	0.1151	0.2580
	Average	0.7131	0.0243	0.0612	0.1517	0.3508
Y-23	1	0.9069	0.0115	0.0656	0.2077	0.4583
	2	0.8106	0.0220	0.0415	0.5087	0.4941
	3	0.5464	0.0379	0.0403	0.0939	0.2700
	Average	0.7879	0.0238	0.0529	0.1695	0.3993



16 May, 1914.

THE COST OF RAISING A DAIRY COW.

Department Bulletin 49, issued January, 1914, reports an investigation of the cost of producing dairy cows on a farm in Wisconsin. The cows were Jerseys, some of them being purebred. The table below summarizes the cost per head of producing three groups of dairy cows, on the farm in question, up to the age of two years. The feed cost is so itemized as to be practically self-explanatory. The item "Other Costs" includes the cost of shelter, equipment, bedding, registration fees, veterinary services and medicine, a share of the overhead expenses of running the farm, interest, etc. It is seen that the net cost of raising a dairy cow to the age of two years is reported as averaging about \$60 a head.

Item.	Cost per Head.		
	1908 group (23 animals)	1909 group (15 animals)	1910 group (12 animals)
Whole milk.....	\$ 4.74	\$ 5.28	\$ 7.36
Skim milk.....	7.89	6.33	6.91
Roughage.....	16.60	16.81	18.40
Grain.....	6.44	6.94	4.45
Pasture.....	3.73	5.39	5.19
Total feed cost	\$39.40	\$40.69	\$42.40
Labor.....	7.86	8.00	7.56
Other costs....	12.91	13.37	14.91
Total cost of raising...	\$60.17	\$62.06	\$64.87
Add initial value of calf	6.30	7.00	7.83
Deduct value of manure....	\$66.47	\$69.06	\$72.70
Net cost.....	8.00	8.00	8.00
	<u>\$58.47</u>	<u>\$61.06</u>	<u>\$64.70</u>



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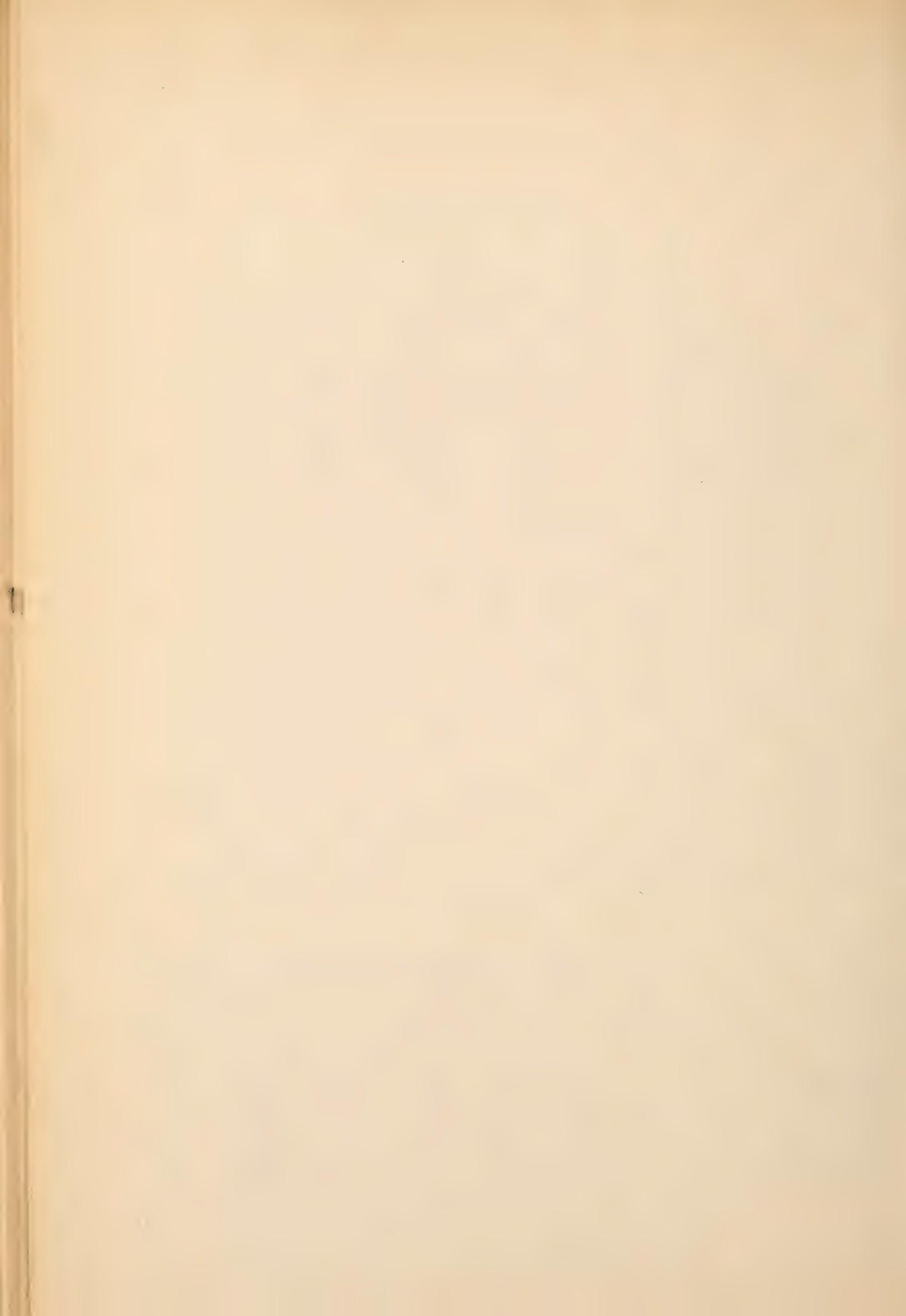
16 May, 1914.

FALL IRRIGATION EXPERIMENTS AT SCOTTSBLUFF.

A manuscript, prepared by Mr. Knorr, dealing with the fall irrigation experiments which were conducted at Scottsbluff during 1911, 1912, and 1913, has been submitted for publication as a Department Bulletin. The manuscript reports in detail the field operations applied and the results secured in the experiments with wheat, oats, barley, corn, sugar beets, and potatoes.

In 1911 results were secured with the three small grains only, but in 1912 and 1913 corn, sugar beets, and potatoes were included. The following table states the average yields obtained during three years with the small grains and two years with the other crops. Series VI was fall irrigated in 1910, 1911, and 1912, and Series VII received no fall irrigation. During the growing season each year the two series received uniform treatment, including irrigation. The wheat, oats, and barley were grown on triplicate plats two years and on duplicate plats one year; corn and potatoes were grown on duplicate plats each year; and sugar beets were grown in triplicate one year and in duplicate one year. The yields of sugar beets are given as tons per acre, and the yields of other crops as bushels per acre. The last three columns of the table state the results in percentages.

Crop.	Number of years	Number of plats	Average yield per acre			Relative yield-per cent.			
			VI	VII	Gain by fall irrigation	VI	VII	Gain by fall irrigation	
		VI	VII						
Wheat.....	3	8	8	33.3	27.8	5.5	119	100	19
Barley.....	3	8	8	36.9	29.9	7.0	123	100	23
Oats.....	3	8	8	83.8	72.8	11.0	115	100	15
Corn.....	2	4	4	59.1	48.5	10.6	122	100	22
Sugar beets	2	5	5	12.3	10.7	1.6	115	100	15
Potatoes...	2	4	4	124.5	122.2	2.3	102	100	2
<hr/>									
All crops..	.	.	.	....	....	....	116	100	16



16 May, 1914.

Fall Irrigation Experiments at Scottsbluff (continued).

The above table shows that the average yields of all crops except potatoes were markedly increased by fall irrigation, the average increase in the yields of the six crops having amounted to 16 per cent. The average results agree very closely with the individual results. Without exception, the average results each year were in favor of fall irrigation, although in a few instances the yields of individual plats were somewhat higher on the land which was not fall irrigated. In view of the average yields obtained each year and during the entire period, the results favor fall irrigation for all the crops except potatoes. With the five other crops the increases in the average yields were sufficient to more than pay the cost of fall irrigation.

These results are to be expected under the conditions obtaining at Scottsbluff and in many other sections of the Great Plains Area, where the precipitation during the fall and winter months is usually very light. During the three years in which the fall irrigation experiments were conducted the average annual precipitation at Scottsbluff was 14.55 inches. The average precipitation of the six months period, October to March, inclusive, during the three years beginning October 1, 1910, was only 2.3 inches, or less than 16 per cent of the average annual precipitation. Since most of this winter precipitation came as light showers and as light snowfall, it added very little moisture to the soil. This being true, the soil on land which had produced a crop the preceding year was usually very dry at planting time in the spring, except where soil moisture was added by fall irrigation.

Soil moisture studies made during the season of 1911 on three wheat plats in Series VI, and three wheat plats in Series VII showed that the soil on the land which was not fall irrigated contained decidedly less moisture in the first six feet than that on the fall irrigated land. This was the case at planting time in the spring and to some extent dur-

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Fall Irrigation Experiments at Scottsbluff (continued).

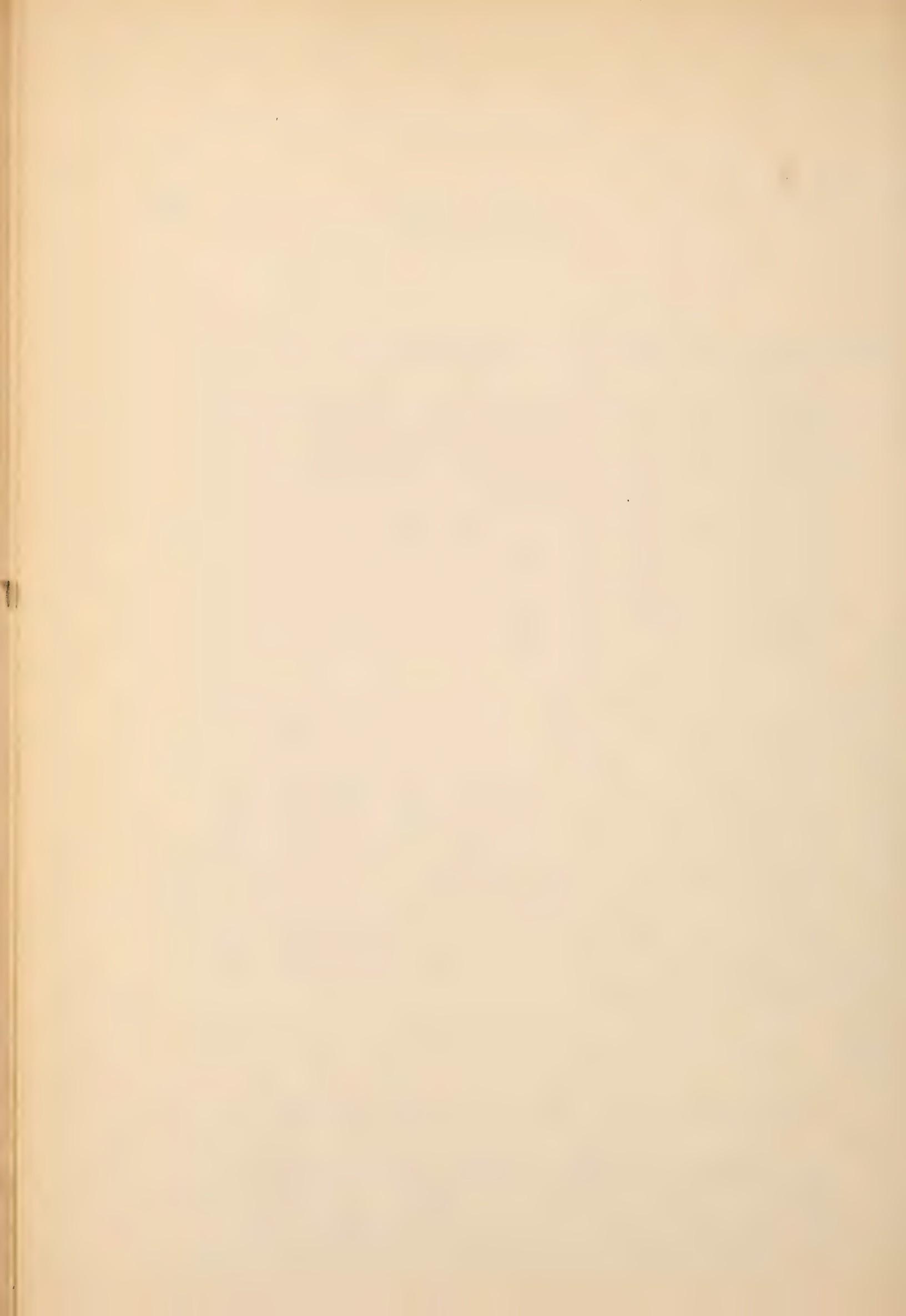
ing the entire growing season. The differences in moisture content were greatest in the lower depths of soil, particularly the 6th foot, which contained from 3 to 9 per cent more moisture on the fall irrigated land than on the land not fall irrigated. The difference in moisture content during the growing season appears to have been due to the fact that the land which was not fall irrigated was comparatively dry at planting time in the spring, and that it consequently absorbed water less rapidly than the fall irrigated land, which was well supplied with moisture at the beginning of the season.

The results of these experiments are so pronounced that there can be little doubt that fall irrigation can be made a profitable practice under conditions similar to those at Scottsbluff, if the operation of the irrigation systems can be properly adjusted. There is some apprehension in some quarters that to run water in the canals during the fall will seriously increase the danger of seepage and waterlogging, and there are some other objections to the practice. It seems likely, however, that if crops yields can be markedly increased by simply applying one irrigation to the land in the fall, the necessary adjustments will be made in the operation and maintenance of the irrigation systems.

F.D.F.

IRRIGATED FIELD CROPS IN WESTERN NEBRASKA.

A bulletin with the above title was issued May 1, from the Nebraska Experiment Station. The bulletin was written by Mr. Knorr, and is based on the work at the Scottsbluff Experiment Farm. It consists chiefly of specific suggestions as to varieties and cultural practices suitable to the



May 16, 1914.

Irrigated Field Crops in Western Nebraska (continued).

production, on the irrigated lands of western Nebraska, of alfalfa, sugar beets, wheat, oats, barley, potatoes, and corn.

The publication contains 32 pages and six halftone illustrations. It is issued as Nebraska Bulletin No. 141.

FIELD NOTES.

Truckee-Carson.

During the week ending May 6 the maximum temperature was 72, minimum 34; precipitation, 0.01 inch.

The following plats were irrigated: C (forestry); N4-5; F7-11-12-16-17-18-19-20-21-22-23-24-25-26-27-28-29.

Plats E7-9-11 were leveled and seeded to hull-less barley and wheat.

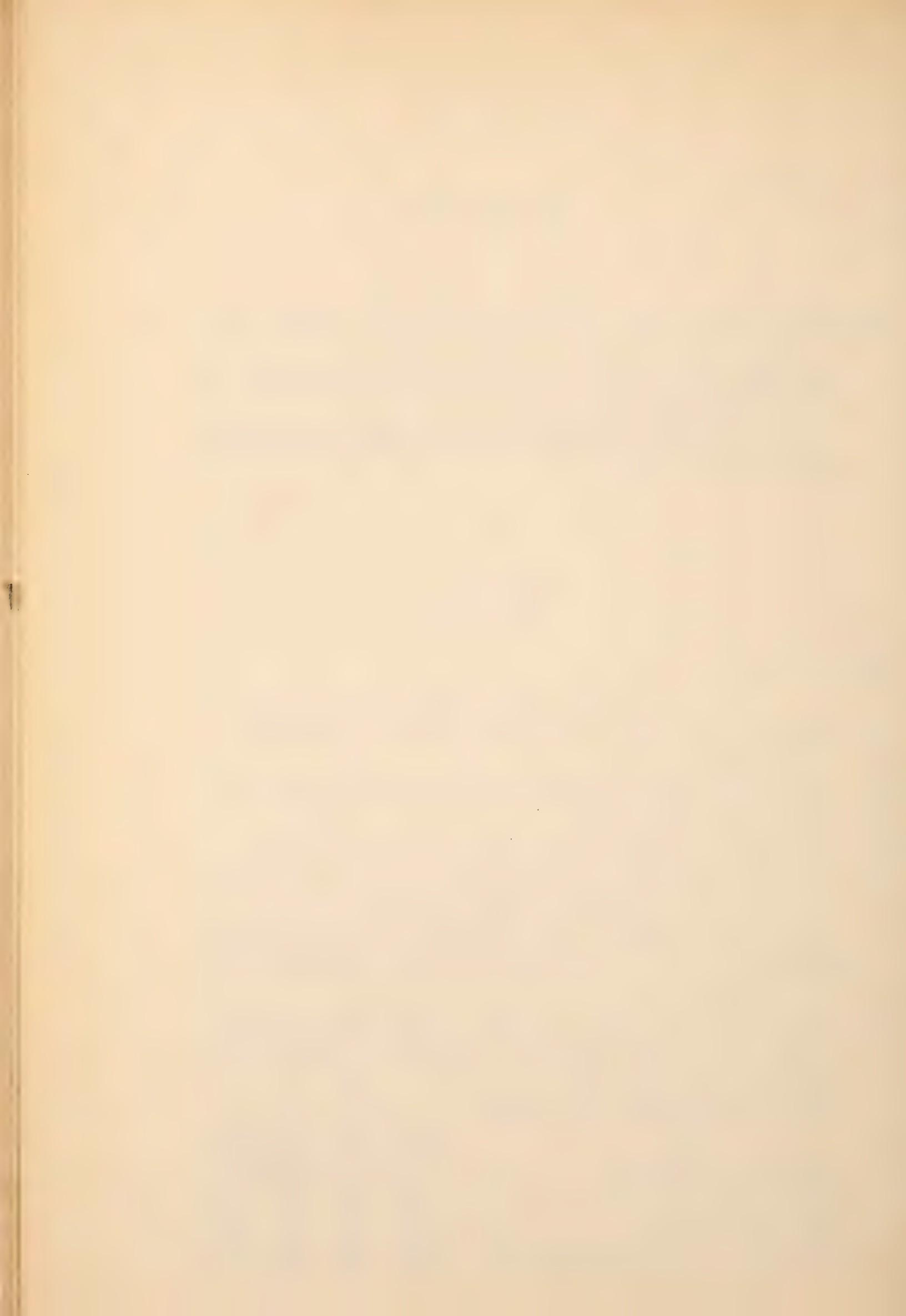
The leveling of E6 and 12 was begun in preparation for seeding to sweet clover.

About one-half acre each of rape and barley, and peas and barley were planted on the Churchill Creamery Farm. These crops are to be tested as hog pasture.

Analyses have been made of samples of water taken from the sump at weekly intervals since the first of the year (except that only 2 samples were taken during January).

The average salt content for each month has been calculated as follows:

	Jan.	Feb.	Mar.	Apr.
Sodium carbonate.....	.000	.003	.005	.002
Sodium bicarbonate.....	.102	.127	.130	.115
Sodium chlorid.....	.038	.049	.048	.056
Sodium sulphate.....	.129	.156	.156	.108
Average total by titration...	.269	.335	.339	.281
Average by evaporation.....	.249	.278	.322	.305



16 May, 1914.

FIELD NOTES.

Truckee-Carson (continued).

The following table shows the amount of electricity used and amount of water and total salts pumped from the drainage system during the first four months of the year 1914.

Month	Kilowatts electricity	Water Pumped.		Average per cent salts	Salt pumped, pounds.
		Cubic feet	Pounds.		
Jan..	29	35,960	2,247,500	.249	5,598
Feb..	38	47,120	2,945,000	.278	8,187
Mar..	76	94,240	5,890,000	.322	18,966
Apr..	92	114,080	7,130,000	.305	21,747

Umatilla.

During the week ending May 2 the maximum temperature was 85, minimum 30; precipitation, 0.27 in.

A heavy growth of vetch and rye was plowed in on field A4, preparatory to planting potatoes the fourth year crop in the rotation.

Field C2 and irrigation experiments in fields B2 and D1 were irrigated.

The rye in the tree rows in fields C1, C2, and D5 was plowed out.

Prof. H. F. Wilson, Entomologist of the Oregon Experiment Station, visited the Farm on Saturday and found a large number of aphids on various field crops and trees.

A second outbreak of hog cholera has occurred, but only a small number of animals were lost.



16 May, 1914.

FIELD NOTES.

Scottsbluff.

Two light showers fell during the early part of the week of May 9, retarding the work to some extent, but toward the latter part of the week the soil was in good shape for farm work.

The corn, sorghum, clover, and alfalfa were planted on the dry land.

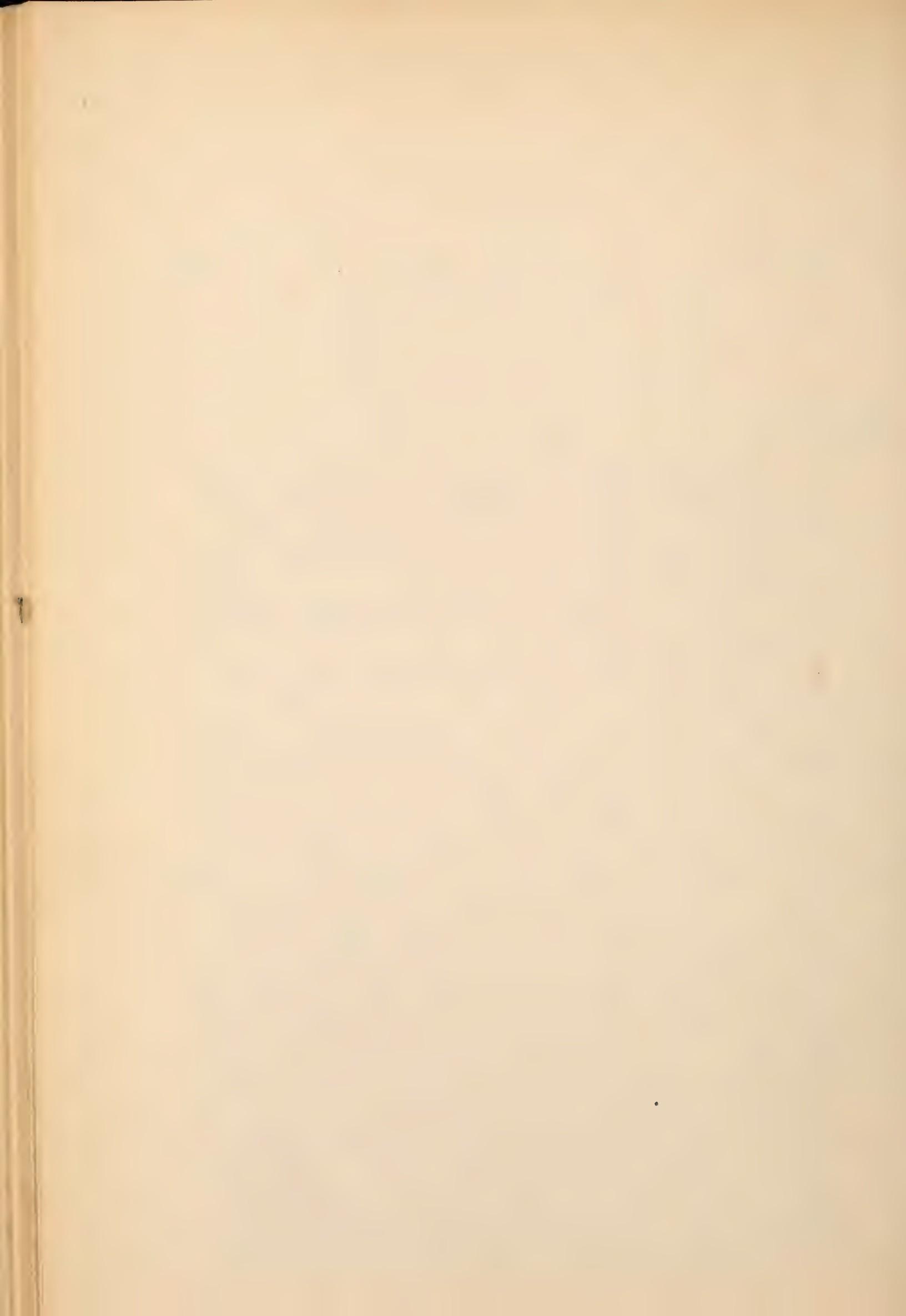
On the irrigated rotations the sugar beets were planted, and the corn land was plowed and put in shape for planting.

The sugar beets in the alfalfa eradication experiment were seeded and the land was put in very good shape.

All of the farm work is being pushed as rapidly as possible in order to get the seed in before the soil dries out too much.

Mr. C. S. Jones arrived at the station Monday, May 4, to look after the hog work in this Valley. The day after his arrival he visited one herd of cholera-stricken hogs and since then has had a number of calls to investigate sick animals in various droves. We have been able to visit a number of large feeders this week, especially Garret Bros., on the Dutch Flats, who run between 400 and 500 hogs, four carloads of which they are now preparing for the market, Mr. Gilbert, just north of the Garrett Bros., who has about 450 head, and a number of other small feeders running from 50 to 200 or 300 head. The conditions found on most of these places are very insanitary, and Mr. Jones intends to take up the fight for sanitation.

On Thursday we had between 45 and 50 business men of Mitchell and Scottsbluff assemble at the farm for a conference with Mr. Jones. These men are very enthusiastic in regard to the future outlook in this work, and immediately organized an association for the protection against hog cholera and other diseases, also for the improvement of the stock.



16 May, 1914.

FIELD NOTES.

Belle Fourche.

During the week ending May 9 the maximum temperature was 80, minimum 31; precipitation, 0.18 inch.

The alfalfa in the rate-of-seeding test and in the time-and-method-of-seeding test was planted. These plantings were the same as in 1913, with the exception that barley, oats, and flax were added as nurse crops in the time-and-method-of-seeding alfalfa. The corn and flax were planted on Saturday in the irrigated rotations.

The orchard has been marked out and the holes dug for the trees.

On Saturday the trees and shrubs for the grounds and Newell Park were received; also the apple trees and small fruits.

The water was turned into the canals on Thursday and got down to the farm Saturday evening. The alfalfa will have to be irrigated soon unless rain falls.

Huntley.

The weather during the entire week of May 11 was favorable for field work. The soil on all parts of the Worden tract has dried sufficiently on the surface during the past two weeks to permit of all crops being planted. The following crops were planted on the Worden tract during the week: Alfalfa, sugar beets, wheat, barley, sweet clover, and oats. The drainage work in the Worden district is progressing rapidly and has already been effective in lowering the water in wells on the farm within 40 rods north of the drain line. Soil samples for salt determinations have been taken on the Worden tract.

Sugar beets for the distance-of-thinning-and-planting test have been planted in Field B-VI.

All of field C has been disked, harrowed, and leveled in preparation for planting, and part of the planting in this field has been done, as follows:



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FIELD NOTES.

Huntley (continued).

CII, seven varieties of peas, as follows: Alaska, Admiral, Advancer, Notts Excelsior, Suttons Excelsior, Gradus, and English Wonder; six selections of soy beans; whippoorwill cowpeas, spring vetch, and dwarf essex rape. CIII, three 1/20 acre plats of each of the following varieties of wheat: Pringgle's Champion, Marquis, Dicklow, and Stanley. CIV, six 1/10 acre plats of sugar beets, to be used for root louse experiment. CV, eight 1/10 acre plats of flax for time-of-irrigation test.

A heavy frost on the night of the 5th and 6th, when the temperature dropped to 22, injured the fruit buds. Reports from the Billings district are to the effect that the apple crop has been generally very severely injured and in many cases totally destroyed.

The following table states the approximate amounts received by the Huntley Project farmers for dairy products since January 1, 1914. The information as to the amount of cream shipped was secured from the express companies handling these shipments, and from the farmers in cases where there is no agent at the shipping points.

Month	Butter fat pounds	Average price butter-fat	Value of cream shipped to creameries	Sweet cream		Butter sold locally pounds	Total value of dairy products
				Gallons	Value		
Jan.	2698	28¢	\$755.44	300	\$300	400	\$88 \$1,143.44
Feb.	2388	27¢	644.76	300	300	400	88 1,032.76
Mar.	2241	26¢	582.66	300	300	400	88 970.66
Apr.	2180	26¢	556.80	300	300	400	88 944.00



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FIELD NOTES.

Huntley (continued).

Weights were taken of the four hogs in Rotation No. 67 for the first period of ten days. The results are as follows:

Individual Weights.

Number.	Weight.		Daily gain	Total gain for period
	Apr. 27	May 5		
1	98	110.5	1.25	12.5
2	110	124.5	1.45	14.5
3	130	137.5	1.75	17.5
4	130	134.5	1.45	14.5
Total	448	507.0	5.90	59.0
Average	...	.....	1.475	....

Days	Number of hogs	Initial weight	% Daily gain	Total gain per day, lbs	Net daily return per acre	Pounds pork per acre per day.
10	4	448	1.27	5.9	\$1.29	23.6

During the week building of headgates and turnouts, cleaning ditches, and hoeing weeds was carried on in Field K.



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FIELD NOTES.

Belle Fourche.

During the week ending May 16 the maximum temperature was 80, minimum 31; precipitation, .76.

The flax varieties were planted on the 14th, on both the dry and irrigated land.

Corn was planted in the fall irrigation experiment the same day.

The orchard and small fruits were planted during the week. Following is a list and number of each variety planted:

APPLES.

15 Oldenburg; 15 Wealthy; 15 Longfield; 15 Northwestern; 15 Malinda; 3 Hibernal; 3 Day; 3 McIntosh; 3 Peerless; 3 Peewaukee; 3 Jonathan; 3 Anisem.

CRABAPPLES.

3 Transcendent; 3 Whitney; 3 Florence; 3 Hyslop.

CURRENTS.

12 Fay; 12 Red Dutch; 12 White Grape; 12 Perfection.

GOOSEBERRIES.

12 Carrie; 12 Smith.

RASPBERRIES.

12 Clark; 12 Cuthbert; 12 Loudon; 12 Marlboro; 12 Turner; 12 Sunbeam.

CHERRIES.

4 Richmond; 4 Montmorency Ordinaire; 4 English Morello.

PLUMS.

4 Surprise; 4 Wyant; 4 Forest Garden; 4 Wolf; 4 Desota; 4 Compass.

BLACKBERRIES.

10 Snyder; 12 Eldorado; 12 Stone; 12 Briton.

The material for planting the grounds and Newell Park was also received and planted during the week. This completes the plantings of the



23 May, 1914.

FIELD NOTES.

Belle Fourche (continued).

Newell Park and the grounds about three-fourths completed. Following is a list of the ornamental plantings and number of each variety:

7 box elder; 7 soft maple; 29 green ash; 3 European ash; 18 Norway maple; 23 Carolina poplar; 16 Lombardy poplar; 10 cottonwood; 27 golden willow; 22 L.L. willow; 50 Russian olive; 19 buffalo berry; 4 basswood; 24 white elm; 35 buckthorn; 22 Black Hills spruce; 5 Colorado blue spruce; 3 white spruce; 4 Norway spruce; 11 bull pine; 14 dwarf mountain pine; 87 mock orange; 20 tart honeysuckle; 99 lilac, common; 86 H.B. cranberry; 80 common snowball; 117 Siberian dogwood; 26 P.G. hydrangea; 58 common barberry; 55 purple barberry; 27 Japanese barberry; 139 V.H. Spirea; 10 Sorbifolia spirea; 86 Opulifolia spirea; 29 Billardi spirea; Rosa rugosa roses; 25 Juneberry; 42 Alpine currant; 25 yellow currant; 61 golden elder; 59 common elder; 6 Russian golden willow; 3 white willow; 2 silver leaf poplar; 12 American elm; 1 white birch; 13 dogwood; 22 flowering currant.

The fencing of plat A-III-16 is very nearly completed. No irrigation has yet been necessary.

Yuma.

The maximum temperature during the week ending May 9 was 100, minimum 50; greatest daily range, 49.

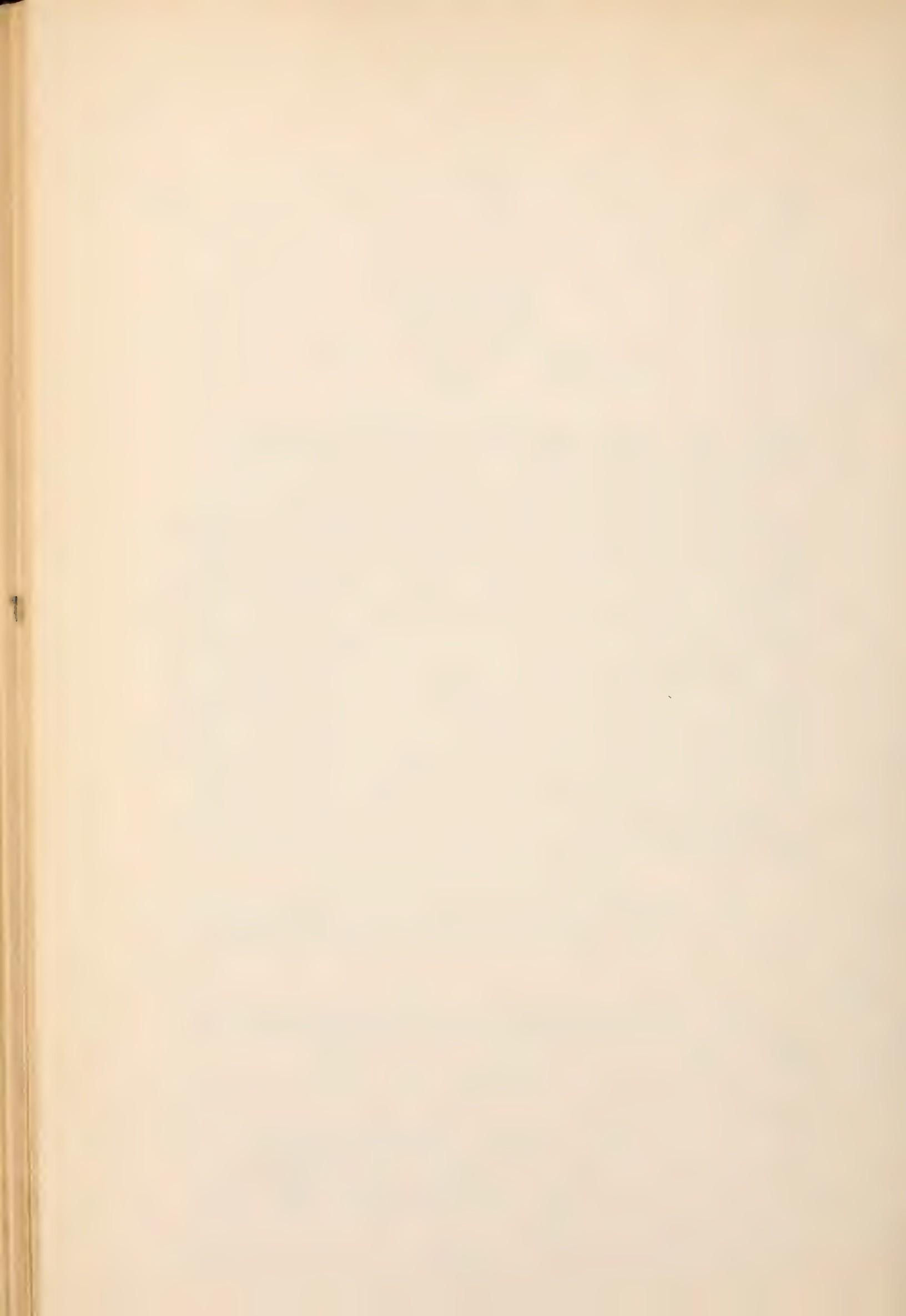
Border E-7 & 8 planted to a variety test of cowpeas.

A variety test of ten varieties of grain sorghum was planted to borders D-8, 9, and 10.

The lastest plats of first cutting of time-of-cutting experiment on E-1 to 6 was harvested.

The deciduous orchard on B series was summer pruned, disked and hoed.

Canadian field pea stubble on section of this orchard, B-25 & 26, was plowed under.



23 May, 1914.

FIELD NOTES.

Yuma (continued).

A variety planting of potatoes on D-16 was hoed and cultivated.

Date and eucalyptus plantings along roads, also garden crops on A-123, were hoed and cultivated.

Pomegranates on C-18 were cultivated.

Row plantings of Sudan grass on C-25 & 26 were cultivated.

Hemp on C-20, 21, and 22 was cultivated.

Cotton on border D-12, 13 and 15 was cultivated.

It was necessary to cut out alfalfa with a hoe on cotton border D-12, 13, and 15.

Messrs. Blair and Peterson spent three days early in the week at Indio and Mecca and other points in the Coachella Valley.

The cool weather continues, making considerable replanting of cotton necessary throughout the Valley.

San Antonio.

The maximum temperature during the week ending May 9 was 92, minimum 55; greatest daily range 30; precipitation 0.10 inch.

By Monday afternoon the fields were sufficiently dry to cultivate. The cultivators were started at once and all the fields were cultivated by Friday evening.

Two men were kept busy cutting weeds throughout the week.

The farm roads were disked on Saturday.

The oats for hay on the rotation plats were cut. They were slightly over-ripe, as cutting was delayed by wet weather. Two plats, A4-6 and A4-14, were cut for grain. Two plats for oats in the oat pasturing experiment were also cut. Two small areas on A3 and D3 were also cut for hay.



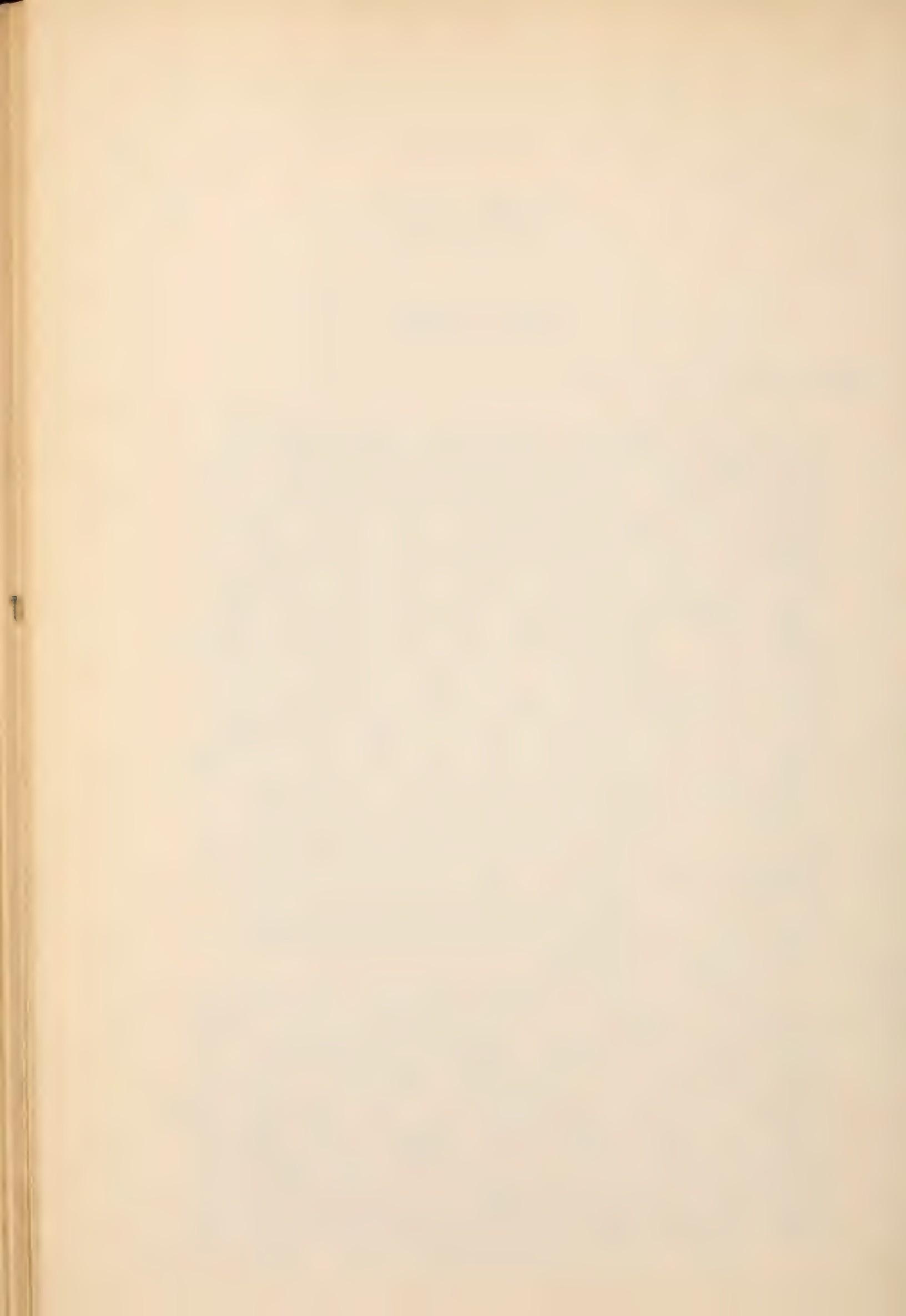
23 May, 1914.

FIELD NOTES.

San Antonio (continued).

On the whole, things are in good shape at the Experiment Farm. Owing to heavy rains of last fall and winter and again this spring, the country looks better than it has for years. The grass and native flowers cover the uncultivated fields and cleared pastures and are knee high. Naturally the weeds are very much in evidence on all farms and the chief difficulty the farmers are having this season so far has been to find time between showers to keep their fields passably clean. The orchards at the farm never looked better and the growth the trees have made this spring is remarkable. The peach crop this season is practically a total failure, but there will be a good crop of plums. Many varieties are so heavily loaded that the fruit will require thinning. Persimmons, pomegranates, grapes, and jujubes are in flower at this time, and there should be a good crop from these fruit trees this season. Our seedling date palms flowered for the first time this season and one plant was pollinated by Mr. Meade. The roses are heavily loaded with flowers this spring, and as there are nearly 80 varieties and over 200 plants, they are a beautiful sight and are attracting considerable attention.

Corn is well advanced and there is a good stand on the whole. There is also a good stand of forage crops in the rotation experiments, and Sudan grass is looking especially promising. We have been very unfortunate in getting a stand of milo this season. The stand on some of the plats in the rotation experiments is very unsatisfactory. There is also a rather poor stand in the rate-of-seeding test on C5. It is rather difficult to account for this poor stand, as a generous amount of seed was used, especially in the final planting. At the last planting 12 pounds to the acre were seeded, where ordinarily 6 pounds to the acre



23 May, 1914.

FIELD NOTES.

San Antonio (continued).

would be sufficient. As a germination test was made before planting, it is certain that it is not due to low vitality. It is believed that the trouble was due to a small ant which eats out the heart of the seed. The stand was not uniformly poor over a plat, nor even in a row, but there were vacant places in a row for, some times, several feet and, some times, for several yards where there is not a single plant to be found. As near as can be learned, this is not merely a local difficulty, but it seems that farmers all over this part of Texas have experienced the same trouble to a greater or less degree.

The final planting of cotton resulted in a good stand on the entire farm, although, owing to late planting, it is somewhat backward.

The oats which earlier in the season promised a good crop of both hay and grain were attacked by rust so severely that the yields will be very materially decreased.

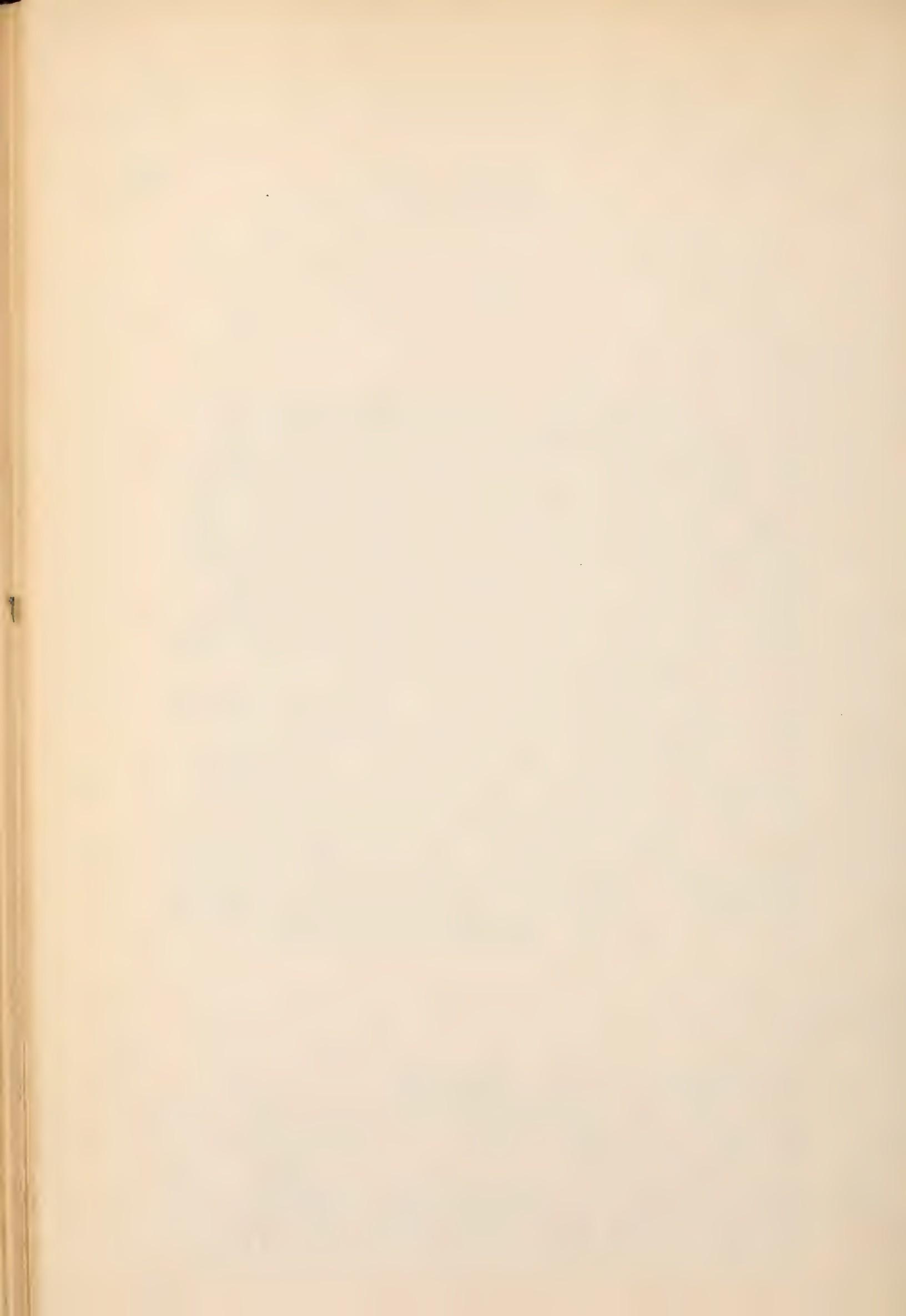
Two extra men are at work cutting weeds and putting the farm in shape, as the work was very much behind, owing to the wet weather of the past two weeks. With a few days more of good weather we should have the work well in hand once more.

^aTruckee-Carson.

During the week ending May 9 the maximum temperature was 84, minimum 38.

Trees and shrubs have been distributed during the spring to farmers and to residents of Fallon as follows:

348 Carolina poplar; 129 Norway poplar; 119 Chinese poplar; 81 Karagash elm; 9 white elm; 181 Chinese willow; 146 Tamarix indica; 42 Tamarix africana; 16 Tamarix gallica; 1755 native tamarisk;



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FIELD NOTES.

Truckee-Carson (continued).

4 hackberry; 8 jack pine; 18 boxelder; 560 Russian oleaster; 5 Russian mulberry; 8 Ponderosa pine; 15 pinion pine; 114 apples; 14 pears; 2 plums.

Sweet clover was planted on D3-7-11-1-5-9.

Plats H23 to 29 and E5 and 8 were harrowed and re-leveled.

The construction of the Y tile drain was continued.

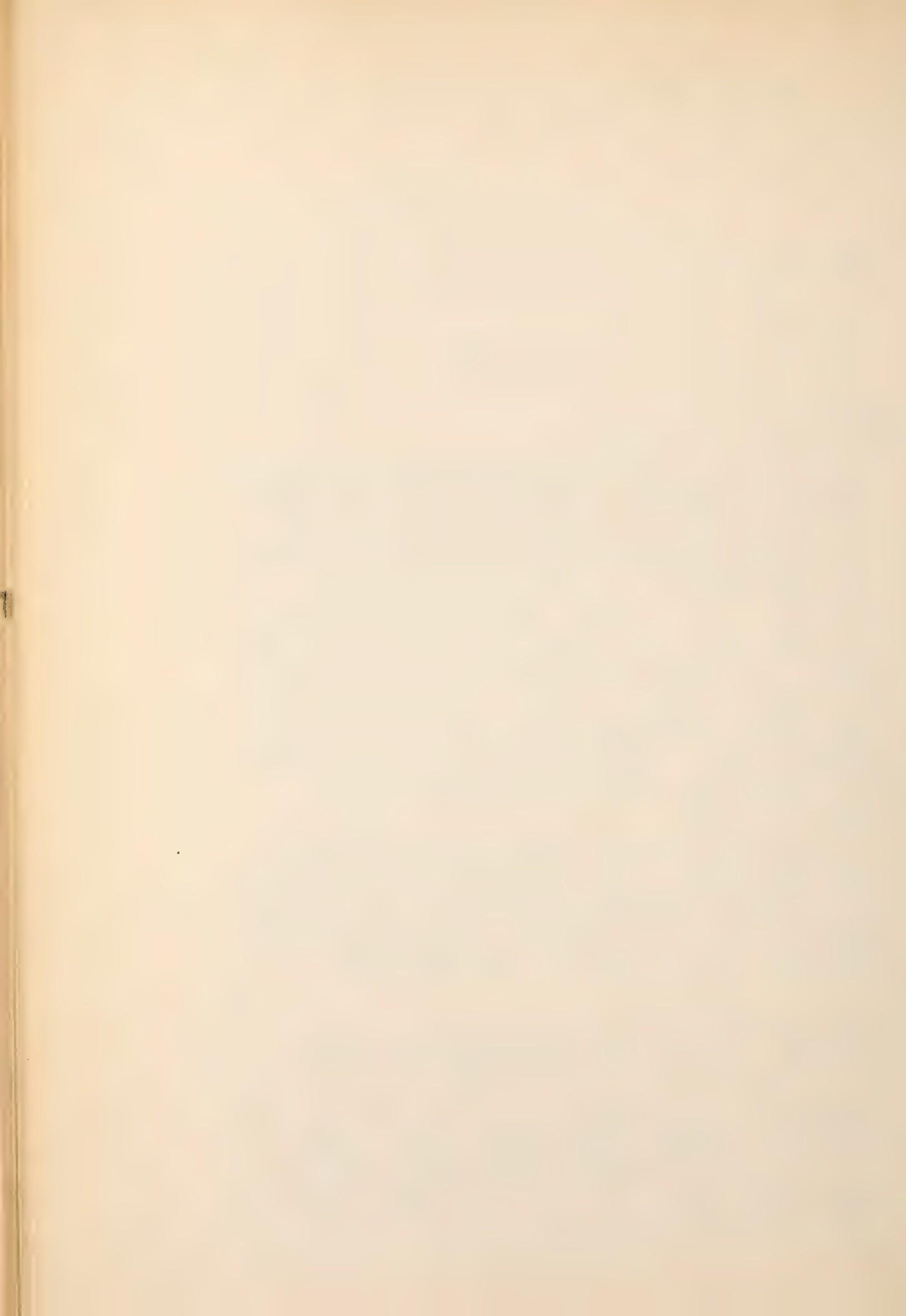
The sweet corn varieties were planted in N1 and the cabbage varieties were transplanted from the hotbed to N5.

One acre of low seepage land on the Churchill Creamery Farm was planted to the following grass mixture: Bromus inermis, western rye grass, alsike clover, redtop, and timothy.

Fields E1, 2, 3, 6, 7, and F1, 2, 3, 4, 5 were irrigated.

Analyses have been made of ten borings of soil from Plat Y-18. This plat is to be treated with sulphuric acid in the irrigation water. It is planned to apply 3,000 pounds of sulphuric acid to this 1/2 acre plat. The results of the analyses are given below, the figures being the averages obtained from the three borings:

Depth.	Total Salts	Na ₂ CO ₃	NaHCO ₃	NaCl	Na ₂ SO ₄
1st foot	.3296	.0248	.0708	.0342	.0829
2nd foot	.3448	.0333	.0516	.0362	.1300
3rd foot	.2684	.0239	.0442	.0305	.1095
Three feet	.3144	.0277	.0555	.0336	.1032



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23 May, 1914.

FIELD NOTES.

Huntley.

No field work could be done during the first part of the week of May 16 because of a rainfall of 0.91 inch on the 10th and 11th. Another heavy rain fell on the 16th and 17th, bringing the total precipitation for the week to 2.36 inches.

Following are the water levels in the Worden tract wells taken on May 15.

Well Number.	Depth to water. (feet)	Difference since May 1
A-1	1.36	.80 rise
A-2	1.66	.73 "
A-3	2.20	.67 "
B-1	2.29	.46 "
B-2	2.23	.53 "

The sudden rise of the ground-water is due probably to the rainfall during the first part of the week. This rain also crusted the soil badly and made it necessary to harrow all of the ground planted this spring.

The drain south of this tract has been completed and extended to lateral "D", or about a mile and a quarter southwest of the Worden tract.

Corn plats were prepared for planting and part of corn planted.

Potato plats were disked and seed potatoes cut and treated for planting.

Rye in rotation 27 was plowed under; rye about 9 inches high.

Weights were taken of the four hogs in rotation 67 for the second period of ten days. The results are as follows:



23 May, 1914.

FIELD NOTES.

Huntley (continued).

Individual Weights.

Number.	Weight.		Daily gain	Total gain for period.
	May 6	May 16		
1	110.5	121.5	1.10	11.0
2	124.5	132.0	.75	7.5
3	137.5	147.5	1.00	10.0
4	134.5	144.5	1.00	10.0
Total	507.0	545.5	3.85	38.5

Average..... 9.625

Percentage daily gain.. 0.73

Net daily return

per acre.....\$0.94

Small gains during this period were probably due to rainy weather.

Umatilla.

During the week ending May 9 the maximum temperature was 83, minimum 31.

Seed of Netted Gem potatoes was secured for fertilizer experiment No. 3 in Field A4, and part of the planting was done.

On account of its being affected with scab and Rhizoctonia, the entire lot of seed was treated with corrosive sublimate.

The State Veterinarian has authorized the Superintendent to apply the "serum alone" treatment to prevent the spread of hog cholera in herds where it breaks out and in otherwise infected herds. For this purpose a supply of serum has been received. One small herd has been treated. The disease is not spreading rapidly, and as quite a number of affected hogs recover it has been determined that the conditions under which most of the animals are being kept renders them less susceptible to cholera

23 May, 1914.

FIELD NOTES.

Umatilla (continued).

than animals fed on grain and kept in dry lots. Many of the hogs on the project are kept in portable pens which are moved about on alfalfa land, and practically all are allowed to feed on succulent pasture.

At a meeting held in Hermiston May 9 for the purpose of organizing a swine breeders' association, with a view to increasing the efficiency of effort in controlling the cholera, about twenty farmers were present. It was decided to call another meeting with a view to enlarging the scope of the organization to include the dairymen as well, as it can be done without harm to the swine breeders and will greatly increase the efficiency of the organization.

The following figures have been received from the Hermiston Creamery, giving the amount of cream purchased from the Umatilla Project for each month since December, 1913:

Month.	Butterfat. pounds.	Average Price	Total Value
January.....	4869	\$0.30	\$1,460.70
February.....	4105	0.30	1,231.50
March.....	5640	0.30	1,692.00
April.....	6312	0.25	1,578.00

As practically all the cream produced on the Project is sold to this firm, no attempt has been made to get figures on what is sent out. Approximately 40 per cent of the cream purchased by this creamery is produced on the Umatilla Project.



23 May, 1914.

FIELD NOTES.

Umatilla (continued).

During the week of May 16 the maximum temperature was 88, minimum 40.

The rye in field B5 and a part of C2 was plowed under without the use of a chain, so as to leave enough straw on the surface to prevent blowing of the soil.

The cantaloupe varieties, of which 16 are commercial and 13 S.P.I. material, were planted in A2.

Prof. C. I. Lewis, Horticulturist of the Oregon Agricultural College and Experiment Station, visited the Farm May 12.

Mr. A. T. Strahorn, of the Bureau of Soils, visited the Farm May 5. He is preparing a soil survey of the Umatilla Project and the west extension of this project which is now under construction.

PERSONAL.

Mr. Farrell left Washington on the 19th for a short field trip to Scottsbluff, Huntley, and Belle Fourche farms.

30 May, 1914.

FIELD NOTES.

Yuma.

During the week of May 16 the maximum temperature was 97, minimum 49; greatest daily range 43.

The following hoeing was performed:

Eucalyptus plantings along roads;

Sugar cane on A-103;

Hemp on C-21;

Melons on A-9.

Cultivating was done as follows:

Row plantings of Sudan grass on A-104, C-25 and 26;

Melons on A-9;

Garden borders; and

Date nurseries on A-12 and 14.

Grain sorghum varieties were planted to plats D-37 and 39 to 42, inclusive.

Isolated hemp plantings were made of different selections for seed production on A-134, C-21 and 26.

Borders A-6, 7, and 8 were disked and planted to Durango cotton for the third time this season. Weather conditions are now much more favorable for securing a uniform cotton germination than during the past two weeks. A very good stand of cotton is desired on these borders to permit of various thinning experiments.

Alfalfa was harvested from fields C-6, 7, and 28.

Wild Palestine wheat was harvested from A-153. The greater part of this grain had shattered on maturing, but the straw will be threshed to secure the remaining grain.

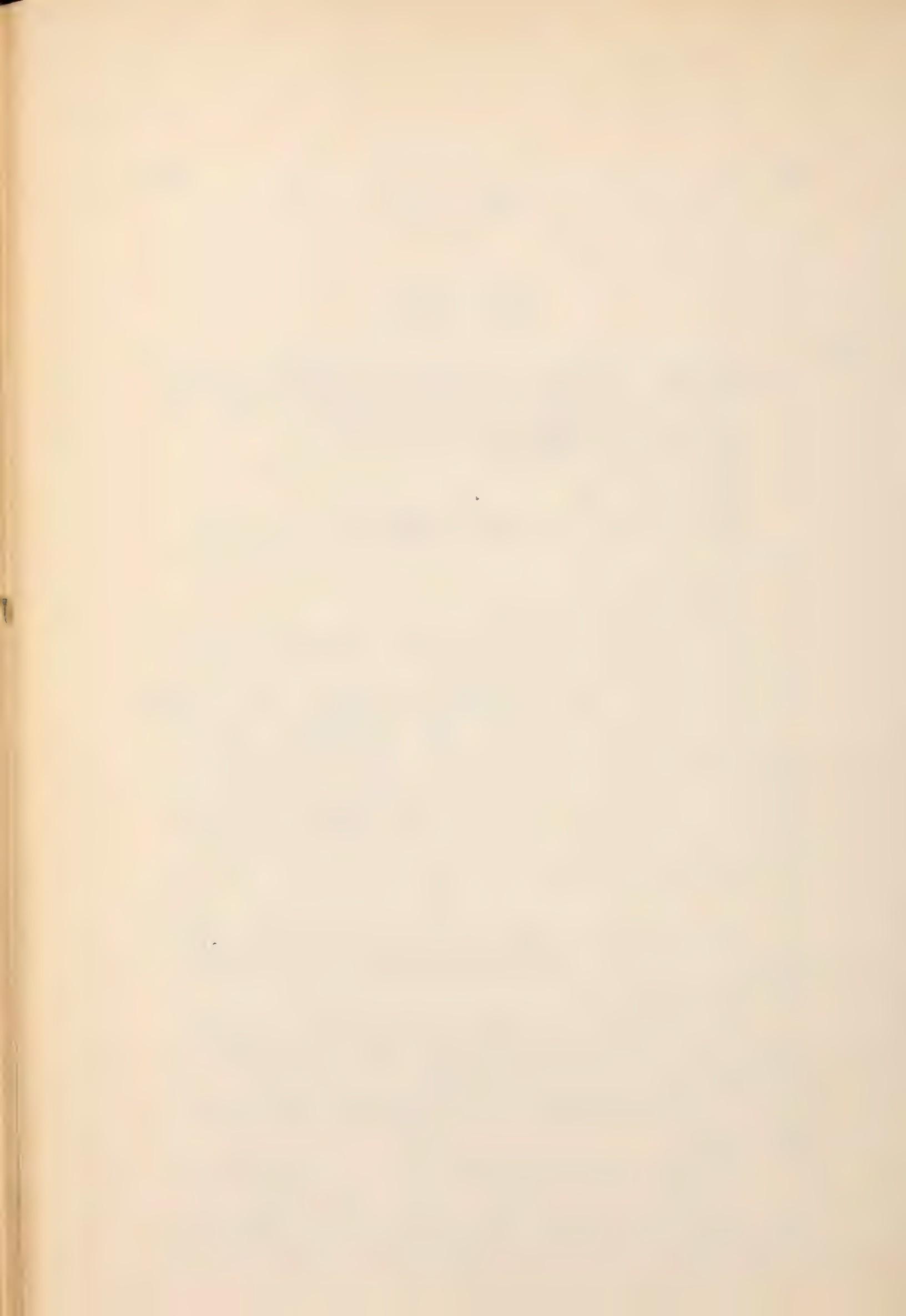
Grape vines on A-156 were staked and tied.

Four hundred and thirty small trees of Eucalyptus rufa were transplanted from pots to the road planting on the south side of the farm.

Thirty-one palms of seedling dates, variety Zehedi, have flowered this season, of which 26 were males.

Seedling fig orchard C-6 to 17 was again summer pruned.

A majority of alfalfa fields being held for seed production in the Yuma Valley this season are at present blooming and apparently making a heavy set of seed.



30 May, 1914.

FIELD NOTES.

Yuma (continued).

Bee men report little honey and not many insects on the alfalfa during days following cold nights of weeks past, because of little nectar in the alfalfa blossoms; but at present the reverse of this condition seems true.

During the week 17.7 acres were irrigated.

The following table states the acreage irrigated and the quantity of water used each months in 1913 at the Yuma Experiment Farm. The second column states the number of days on which irrigation water was used during the month. In all the months except January some of the land was irrigated more than once.

Month.	Number of irrigation days.	Acres irrigated	Water used acre-feet	
			Total	per acre
January.....	1	2.70	1.65	0.612
February.....	6	26.80	23.80	0.851
March.....	5	48.68	22.80	0.469
April.....	6	50.86	29.76	0.585
May.....	4	43.44	30.73	0.707
June.....	7	60.55	58.95	0.973
July.....	10	59.89	75.37	1.258
August.....	6	63.08	48.44	0.768
September....	6	60.73	43.14	0.710
October.....	5	47.10	27.29	0.579
November....	4	25.63	15.87	0.619
December....	2	15.84	14.57	0.919
All Year.....	62	65.176	391.37	6.000

30 May, 1914.

FIELD NOTES.

San Antonio.

During the week of May 16 the maximum temperature was 89.5, minimum 58; greatest daily range 30. The total precipitation for the week was 2.46 inches.

Cutting oats for grain on the rotation plats was completed on Monday.

All milo and sorghum plats were cultivated with the sweeps to kill what weeds were left after cultivating the previous week.

A rain of over two inches on Tuesday night prevented field work until Friday.

Corn, milo, sorghum, and cotton were cultivated on the rotation plats again.

The orchards and fallow plats were also re-cultivated.

Oat selections were harvested on Friday and Saturday. In the 22 selections planted last fall there has developed important differences in the selections, especially as to earliness, fruitfulness, and straw. Leaf rust was very bad on practically all the selections, there being but one lot that seemed to be entirely free from rust. This selection although being the latest to mature is the most promising of all. There was only slight damage to the stem from rust, the stems being bright and apparently quite free from rust.

Mr. Hastings returned from a two days trip to Boerne on the 10th. While there he spent some time in collecting plants.

Messrs. Cardon and Taylor returned to the station on the 14th.

Scottsbluff.

During the week of May 23 there were four nice showers, with a total precipitation of 0.75 inch.

30 May, 1914.

FIELD NOTES.

Scottsbluff (continued).

All of the crops, especially on the dry land, are in fine condition for this time of year.

Some portion of the alfalfa fields began to suffer for water, and irrigation was started May 20. So far there has been a good run of water.

All of the seeding is practically completed, including the planting of potatoes. The potatoes on Field K have been cultivated; also the potato varieties.

The beet cultivator was started in the early seeding, but showers prevented any further work.

A number of farmers in the Valley have reported a disease in the alfalfa. Upon investigation it was found to be mildew, the same disease that is prevailing on the experiment farm. We have found on our alfalfa fields that only the 1913 seeding is affected to any great extent; only here and there can we see any signs of it in the older seeding. Upon further inquiry and investigation we find that in all cases the new seeding is suffering most. Present indications are that by the time irrigation starts this trouble may be checked. We hope to make some close observations in regard to this matter and report later on.

Chancellor Avery, of the State University, visited the farm May 21.

Mr. Farrell arrived May 22.

Belle Fourche.

During the week of May 23 the maximum temperature was 79, minimum 49; precipitation, 1.08 in.

The flax was planted in the dry-land rotations.

The potatoes were planted in the fall irrigation experiment (Field P), and the following varieties of potatoes were planted in Field O, with two duplications: No. 15044; Russ; Pearl; Early Ohio; Peach; No. 4452; No. 8114; Triumph; Albino.

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FIELD NOTES.

Belle Fourche (continued).

On Tuesday the hogs were started on alfalfa pasture (Rotation 65; A-III-16); 6 hogs, total weight, 620 pounds.

The plats in the pasture experiment were fenced. The only surviving grasses are Brome, Western wheat, white clover, and alfalfa. The stand is very poor, except on the plat containing alfalfa.

The trees planted around the grounds were mulched with straw.

The frequent showers during the week interfered with field work. The balance of the time was spent on the irrigation system, cleaning ditches and putting in checks, and in repairing the water system.

Truckee-Carson.

During the week of May 16 the maximum temperature was 82, minimum 37.

The work of laying the 10-inch tile in the "Y" drain has been completed.

Plats G4 and 5, and H9 were leveled.

Friday, May 15, was appointed by the Mayor of Fallon as "Clean-up" Day for the city. The day was also kept at the Experiment Farm, and all laborers were taken from their field tasks and set to cleaning up around the buildings and grounds.

Mr. A. Griffin, Superintendent of Irrigation on the Truckee-Carson Project, has brought in from California 12,000 sweet potato plants, which have been sold to farmers at cost. The same thing was done by Mr. Griffin in 1913 and fairly encouraging results were obtained.

A sample of water obtained from Big Soda Lake on May 3 was analyzed by Mr. Curtis and salts found to be present as follows:

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FIELD NOTES.

Truckee-Carson (continued).

Na_2CO_3 1.715%

NaHCO_3192%

NaCl 4.090%

Na_2SO_4360%

Total salts by
evaporation..... 6.910%

Following are results of analyses of ten borings of soil from Plat Y-17, the figures being the averages obtained from the three corings.

Depth.	Total Salts	Na_2CO_3	NaHCO_3	NaCl	Na_2SO_4
1st foot.....	.3034	.0178	.0440	.0530	.0620
2nd foot.....	.2954	.0367	.0422	.0349	.0795
3rd foot.....	.3668	.0292	.0357	.0279	.0775
Three feet.....	.3861	.0316	.0480	.0330	.0763

Belle Fourche.

Under date of May 25 Mr. Aune writes as follows:

"The alfalfa for hogging in Rotation 65, Plat A-III-16, was fenced and the hogs turned in May 19, on the south half of the plat.

The alfalfa was probably somewhat too large, so six hogs (total weight 620 pounds) were turned in. As soon as the alfalfa is pastured down most likely two of these will have to come out.

30 May, 1914.

FIELD NOTES.

Belle Fourche (continued).

The hogs used are late fall pigs (Duroc Jersey), in good thrifty condition. The alfalfa this year seems to have made a much better growth than in previous years.

The spring has been very favorable to date for all crops and the farm never looked better at this time of year.

No irrigation has been necessary, but alfalfa will have to be irrigated this week.

The plats in the irrigated rotations on the north half of Series I are very much better than in any other year and at this time show up favorably with the balance of the field.

Good stands have been secured on all crops, especially sugar beets and the spring-seeded alfalfa.

The outlook for crops in general on the project never has been better. Some of the farmers have been rather late in getting in their crops, but we have had sufficient rain to bring all crops up and good stands have been secured in most cases.

All farmers are getting into live stock of some kind as much as they can, especially dairy cattle and hogs pastured on alfalfa.

A cooperative creamery association has been formed at Newell and the creamery is nearly completed. I think this creamery is just a little ahead of time, as I doubt very much if there are cows enough in the vicinity to make it go; but I hope they can make it succeed."

6 June, 1914.

FIELD NOTES.

Yuma

During the week ending May 23, the maximum temperature was 104, minimum temperature 51, and greatest daily range 46.

Leveling on the A series, below the seedling date plantings on Border 21, was completed and bordered. Irrigation turnout boxes were also made for these borders. These new field numbers will be 22, 23, 24 and 25, all of which will likely be ultimately planted to date palms. During the present season it is planned to plant seedling plants of varieties Menakher and Tafilet on Borders A 24 and 25. A 22 and 23 will be broadcasted to cowpeas during the present season.

Practically all crops in row plantings on the Farm, both in the nurseries and in the field, were cultivated this week. Much work was also expended in hoeing weeds and grass from various crops and borders. Bamboo plantings on A-131 were pruned of frost injured growth of last season. After the growing weather of the present season began, much wood, which was apparently dead, revived, and the clumps have brought through the winter considerable growth uninjured by frost. The growth of culms has not yet started to any extent, and it was noted that these species made the rapid growth last season during the last two weeks of August.

Hemp plantings on C-21 and 22, also the Durango planting on D-15, were thinned during the week. These hemp plantings are four different strains, planted for seed production at varied row distances; also, for thinning to varied plant distances in the rows, ranging from 48 to 12 inches. A thinning experiment of Durango cotton is being conducted on Border D-15; various thinning distances and dates of thinning being tested. Durango cotton was re-planted to Border D-14 in a close planting and thinning experiment. Orchard stakes for dates in orchard and avenue form on the Farm were painted and stenciled. Eighteen acres of land were irrigated during the week.

6 June, 1914.

FIELD NOTES.

Yuma (continued).

Contrary to the report made during the week ending May 16, regarding alfalfa seed prospects for the Yuma Project, observations now indicate that many flowers and pods are falling, and it will be necessary to mow much of the second crop of alfalfa for hay, and attempt to secure a seed crop from the third cutting. All fields where the first cutting was left for seed have set and are apparently producing an exceptionally heavy seed yield.

The Colorado River registers a gauge reading at Yuma of 25.3 feet, which is approaching the danger mark for the lowlands which lie close to the levee. On the California side of the Project some land has a water plane dangerously near the surface, and should the River hold at the present level, the pressure will, no doubt, be great enough to bring the water to the surface.

Belle Fourche,

During the week ending May 30, the maximum temperature was 85, minimum temperature 35, and precipitation .17 inch.

All of the alfalfa and winter wheat in the irrigated rotations was irrigated during the week; also, clover in rotation 66. The orchard, small fruit, and alfalfa and trees around the grounds were irrigated.

The corn and sorghum were planted on the dry land rotations, and the corn varieties on E-1; also, the irrigated corn varieties in the field west of the buildings.

All the beets have been hoed and the spring seeded alfalfa weeded.

The hogs pastured on rotation 65 were weighed: No. of days pastured, 12; gain 84 pounds; gain per day, 1.16 pounds; feed consumed, 230 pounds of shelled corn, @ \$1.70 per hundred; market price for hogs at Newell, 7¢. One-half of the plat was pastured during the period:- \$5.88 worth of pork

6 June, 1914.

FIELD NOTES.

Belle Fourche (continued).

was produced, and \$3.91 worth of corn consumed. At this rate there was a net gain of \$15.75 an acre, and \$1.31 per day for the alfalfa.

San Antonio.

During the week ending May 23, the maximum temperature was 82.5, minimum temperature, 62, and greatest daily range, 19. The total precipitation for the week was 3.69 inches. The entire week was very wet, and practically no field work was done.

The continuous wet weather damaged the oats cut for hay very materially. These were scattered out for drying on Saturday. It was also necessary to open a large proportion of the oat shocks cut for grain, in order to get the bundles dried properly.

A part of the time, when it was too wet for field work, was spent on the grounds, and working on the tools and harnesses.

Huntley.

During the week ending May 23, oats in the fertilizer test on Field B VII were planted. Acid phosphate was applied to the plats at three different rates per acre, as follows: (1) 300 pounds, (2) 500 pounds, (3) 700 pounds, and (4) no fertilizer. The plats are run in triplicate.

Elven varieties of corn in the variety test in Field B VI were planted as follows: Northwest Dent, Minnesota #13; C. I. Selection #133; Brown County Yellow Dent; Martins Dent; Gehu Flint; Cassia County Flint; Triumph; Ft. Peck Sqaw; and Longfellow.

On the Worden tract a good stand of all grains has been secured, both on the old ground and that broken last fall. The stands of beets is good on the old land, and only fair on the sod. In most

6 June, 1914.

FIELD NOTES.

Huntley (continued).

cases the alfalfa stand is only fair; the ground is in rather bad condition due to baking as a result of the recent heavy rains.

Planting of corn was completed. All potato plats were planted excepting in rotation 27 (rye plowed under). Corn and potato plats were harrowed after planting.

Umatilla

During the week ending May 23 the maximum temperature was 86, minimum temperature, 39, and precipitation .36 inch.

The first cutting of alfalfa was made on Fields A1, B1, and C1. The harvesting was done early to prevent the grass, which is infesting the fields, to go to seed. As soon as the hay was removed, the land was thoroughly harrowed to prevent the grass shooting up and maturing seed before the second cutting of alfalfa.

The cantaloupe variety test was planted, and the transfer of eggplants to the field completed.

The heavy shower of May 23 caused slight injury to many fields of hay that were uncured.

Of the several means which have been employed in combating the grasshoppers, the hopperdozer is giving best results. Several acres of young orchard have been completely defoliated by these insects, but will survive if the new foliage is not destroyed.

TRANSPORTATION REQUESTS.

Under date of June 1, the following memorandum in re Transportation Requests was issued by the Office of Records:

"As transportation requests issued on 1914 appropriations are not good after June 30, 1914, you are requested to return without delay any unused 1914 trans-

6 June, 1914.

Transportation Requests (continued).

portation on hand July 1 to this office for cancellation. In this connection your attention is invited to paragraph 12 of the Fiscal Regulations.

By direction of the Chief of Bureau.

(Signed) W. P. Cox

Officer in Charge of Records.

FIELD NOTES

Truckee-Carson.

During the week ending May 23, the maximum temperature was 85, minimum temperature 44.

The first application of gypsum was given to Y-1, 3, 4, 6, 7, 9, 10, 12, 13 and 15 at the rate of 2 tons per acre. The gypsum was plowed under as soon as applied.

Twenty varieties of tomatoes, eight varieties of watermelons, and eight varieties of muskmelons were planted on A-1.

The following varieties of potatoes were planted on the ranch of A. R. Merritt: Colorado Pearl; Early Ohio; Red Ohio; Extra Early Ohio; White Beauty; Early Triumph; Extra Early Triumph; Burbank; Seneca Beauty; Rural New Yorker; Gold Coin; Rusty Coat; Irish Cobler; Early Rose; New White Victor; Livingston; Earliest of All; Early Freeman; Early White Prizetaker; Pride of Multnomah; New Snow; Hundred Fold; Great Divide; Banner.

The following figures show the number of pounds of butter fat purchased and paid for by the Churchill Creamery, and the average price paid for same since January 1, 1914.

	<u>Lbs.</u>	<u>Average Price.</u>
January	10204	.30
February	10366	.262
March	13793	.227
April	14916	.23

The composition of the water running into the sump from the Y drain is higher in carbonates and bicarbonates than that coming in from the H drain,

6 June, 1914.

FIELD NOTES.

Truckee-Carson (continued).

as shown by analysis:

Composition of water from H and Y drains.

	<u>H</u>	<u>Y</u>
Sodium carbonate	.000%	.015%
Sodium bicarbonate	.083	.175
Sodium chloride	.070	.065
Sodium sulphate	<u>.113</u>	<u>.135</u>
Total salts	.266	.390

Following are results of analyses of ten borings of soil from Plat Y-16, the figures being the averages obtained from the three borings:

Depth	Total Salts	Na_2CO_3	NaHCO_3	NaCl	Na_2SO_4
1st foot	.2908	.0265	.0696	.0205	.0460
2nd foot	.3032	.0306	.0479	.0344	.1150
3rd foot	.2916	.0278	.0469	.0366	.1105
Three feet	<u>.2953</u>	<u>.0282</u>	<u>.0526</u>	<u>.0303</u>	<u>.0931</u>

Scottsbluff

On May 28 there was .48 inch precipitation, which included a considerable amount of hail. The hail cut the alfalfa and some other crops a trifle, but no serious damage was done on the farm. About one-half mile south of the Farm the damage by the hail was more apparent and more serious, and one mile south some alfalfa fields were damaged to such an extent that cutting of the crop was necessary.

During the week ending May 30 irrigation of the alfalfa and the pasture grass plats was completed. The potatoes were cultivated, and all of the corn on the farm harrowed thoroughly. The cutting of weeds along the road and alleys was started and almost completed.

6 June, 1914.

Scottsbluff (continued)

One-half of the early seeding of sugar beets was thinned out, and a fairly good stand was secured. There seems to be considerable trouble on the Project this year in getting a stand of beets. Many fields are affected by what some farmers call "black root". The State University diagnosed it as Fusarium several years ago.

The State has purchased a Ford Touring Car for use on this Station.

CONDITIONS AT SCOTTSBLUFF.

Under date of June 1, Mr. Farrell reports as follows, concerning conditions on the North Platte Project.

"Crop conditions on the Project are excellent. It is generally conceded that things look better this spring than they ever have before. The farming methods used by the settlers are gradually improving. The weather conditions this spring have been generally favorable, and the crop prospects are very good.

The rainfall this spring has varied considerably on different parts of the Project. There has been abundant rain in most sections, except the Dutch Flats, where the precipitation has been rather light. At the Experiment farm, the rainfall from April 1 to May 27 amounted to 4.51 inches this year, as compared with 3.53 inches in 1913. This year's rainfall has come in frequent showers which have kept the surface soil in good condition for spring planted crops. This year there were twenty-one showers at the Experiment Farm between April 1 and May 27, as compared with ten showers during the corresponding period last year. As a result, the seed of spring planted crops have germinated well. There have been no destructive hailstorms this year. On May 29 some slight damage was done to alfalfa near the Farm by hail, but there has been no damage comparable to that which resulted from hail May 12 and 13, 1913.

The alfalfa crop looks exceptionally well all over the Project. The first cutting will be made about three weeks earlier this year than it was in 1913. This comparative earliness is probably due

6 June, 1914.

Conditions at Scottsbluff (continued).

to the frequent showers and to the absence of hail early in the season. The farmers are now applying the first irrigation to the alfalfa.

Very little of the 1913 crop is left on hand, at least on the farms in the vicinities of Scottsbluff, Minatare, Mitchell, and Morrill. This was rather surprising in view of the supply last winter, but it appears that much of the hay was sold at almost any price in order to dispose of it.

A rather large acreage of alfalfa has been plowed up this year. On the older lands of the Project, particularly, in the Dutch Flats district, this is very noticeable. Much of the alfalfa land is being planted to potatoes. It is encouraging to note that the farmers are beginning to appreciate the desirability of turning under alfalfa, and an increase in crop yields and improvement in soil conditions is to be expected.

The agriculturist of the sugar company informed me that the beet acreage this year is about 22,000 acres. He said that many of the farmers have planted more than their contracts call for. The price this year is \$5 a ton, flat rate, for direct delivery, and \$5.50 a ton for siloed beets.

I believe Mr. Knorr sent you some samples of beets affected with "brown root". This difficulty is very widespread. We found it in every field we examined. I do not think it will be serious, however, because it seems likely that the affected plants - or most of them - will recover. We transplanted some specimen beets at the Farm, so as to be able to watch them closely to see what the effect of the disease will be. Although the roots are discolored and superficially decayed, the tops remain vigorous, and the inner parts of the roots appear to be unaffected.

Much of the beet land is being cared for by Russians. The Russians are usually paid \$20.00 an acre for thinning, hoeing, and topping, the land-owner furnishing a shack and hauling the groceries from town. Some of the contracts call for \$18 an acre, plus 25 cents for each ton in excess of 13 tons per acre. Ordinarily, the Russians have time

6 June, 1914.

Conditions at Scottsbluff (continued).

to do additional work, particularly, in the haying season. They appear to be doing well, and quite a number of them are acquiring farms. Some beet land is rented to Japs and others for a cash rental of from \$6 to \$7.50 an acre, the landowner paying the water charges.

Mr. Knorr stated that there is a large increase in the acreage of corn this year; but I was not able to find out what the total acreage is. The crop is coming up well all over the Project, and the fields are in good condition.

The demands for irrigation water are much heavier this year than in any previous year at this time. The lack of rain in some districts and the stimulated crop growth early in the season in others have resulted in heavy demands all over the Project. The rotation system of delivery - 4 days on and 4 days off - was started last week. In 1913, it was not necessary to rotate until July. Mr. Weiss stated that the farmers generally take kindly to the rotation system after they have given it a fair trial, and several farmers told me the same thing.

Mr. Weiss has some very interesting figures on the quantity of water used by farmers on different soils in 1913. He had the ditch riders classify the farmers as "good", "fair", and "poor" irrigators, in the different districts. Little weight can be given the ditch rider's classification, but the figures on the water used on different soils are very interesting. They are as follows:

Soil	Number of farms	Crop Value		Water used per acre feet
		per acre	acre foot	
<u>Heavy Sandy Loam</u>				
Good	287	\$19.09	\$7.66	2.5
Fair	78	15.28	6.44	2.4
Poor	11	11.12	5.53	2.1

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Conditions at Scottsbluff (continued).

Soil	Number of farms	Crop Value		Water used per acre foot acre feet
		per acre	per acre foot	
<u>Light Sandy Loam</u>				
Good	132	\$12.11	\$4.86	2.5
Fair	91	10.15	4.14	2.5
Poor	37	6.50	2.55	2.5
<u>Very Sandy.</u>				
Good	48	9.75	3.95	2.5
Fair	45	7.57	2.64	2.9
Poor	22	6.12	2.48	2.5

We visited the sandy district, including the Safely place, which you saw in 1912. Conditions there are very much improved. On the Safely place, where wheat was grown in 1912, there is now a good crop of alfalfa. The land which was in corn when we visited the place in 1912 was planted to rye in the fall of that year, and was planted to alfalfa this spring. A fair stand is coming up, and it looks as if the land will be reclaimed without further difficulty. There is a thin stand of volunteer rye and weeds, and there are no evidences of soil blowing. With proper care, the alfalfa should succeed. All the farms in the immediate vicinity have good stands of alfalfa, so that it appears that the farmers in that locality have the sand problem well in hand.

The district about 2 or 3 miles northeast of the Farm, where we saw the badly seeped land two years ago has practically all been reclaimed. The drains put in by the Reclamation Service have been very effective. Where we saw swamps in 1912, there are now good fields of alfalfa, beets and other crops, and practically no swamp land. One farmer whose farm was badly seeped in 1912 grew 20 tons of beets and 3 tons of timothy per acre in 1913. On this and some other farms, little or no irrigation was

6 June, 1914.

Conditions at Scottsbluff (continued).

necessary last year. The ground water is from 4 to 8 or 10 feet from the surface.

There is some apprehension that there will be drainage difficulties in the Dutch Flats district in the near future. Mr. Weiss stated that the water level there has risen to within 11 feet of the surface in some places. He hopes that by a careful use of water, the situation can be prevented from becoming serious.

Things are looking very well indeed at the Experiment Farm, except for the difficulty with hog cholera. Up to the time I left, 7 hogs had died; six of these were in the experiments, and their loss causes a good deal of difficulty. All the hogs have been vaccinated, and it is not likely that any more will contract the disease. There are, however, several that are sick, and will probably die.

The alfalfa seeded after oats in the rotations last fall looks extremely well. Perfect stands have been secured on all three plats, and high yields will be obtained this year. It looks as if this method of planting is a complete success. Mr. Knorr tried it last August on six acres in Field D, where grains were grown last year. Two acres were drilled in without preparatory treatment, 2 acres were single disked before planting, and 2 acres were double disked before planting. Excellent stands were secured on all three tracts, and no difference are evident at this time.

The spring planted alfalfa in the rotations is coming up in fine shape. The frequent rains have kept the surface soil moist, and there will be good stands on all the plats.

Some good results will be secured from the alfalfa eradication experiments. It is too early yet to get more than a rough estimate on the results of the different treatments, but there are some marked differences. From present indications, it appears that the best eradication resulted from plowing under the second crop last year, but Mr. Knorr states that the work of plowing was much heavier with the second crop than later in the fall or

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Conditions at Scottsbluff.

early this spring. Beets have been planted on the 23 plats used in the experiment. Before these are cultivated, counts of the alfalfa plants will be made. These counts, together with observations to be made later in the season, will furnish some valuable information on the question of eradication. It will be necessary to consider the labor of plowing, etc., involved in the different treatments and the comparative difficulty of cultivating the beets this year, as well as the loss of the hay plowed under in some of the treatments.

Some good results are being obtained in the pasture grass test. Good stands have been secured with Italian rye grass, common oat grass, timothy, red top, Kentucky blue grass, orchard grass, meadow fescue, tall fescue, and perennial rye grass. Tall oat grass winter killed almost completely, and western wheat grass failed to germinate.

The pasture mixtures look well, except that there is too much alfalfa in one and too little clover in another. It appears that to get clover started in the pasture mixtures will be the chief difficulty. I think another difficulty will be that the farmers, at first, will not irrigate frequently enough. In spite of the abundant rains at the Experiment Farm, the pasture grasses needed water badly when the water was turned into the canals. I suggested to Mr. Knorr that he run a simple irrigation test on a 3/4-acre plat of mixed grasses. I also suggested that he try replanting white clover on some of the mixed-grasses plats.

There are at present about 3.5 acres of pasture at the Experiment Farm available for use when the dairy cows are brought to the place. This will afford a good opportunity for some simple pasture tests.

There are very few dairy cows on the Project at present, but I look to see a big increase in this class of stock during the next few years, particularly, if the growing of sugar beets is discontinued, or greatly reduced. Mr. Knorr has not yet been able to get figures on the value of dairy products sold. The total sales are undoubtedly very small, and the aggre-

6 June, 1914.

Conditions at Scottsbluff (continued).

gate is composed of a large number of small and widely scattered sales. Some of the farmers sell butter to the stores, but the latter keep no separate records of their purchases, and for this reason can not furnish any figures.

The dairy barn at the Farm is about completed. It will house six cows. The University plans to buy 4 common grade cows on the Project and to send 2 purebred cows and a bull from Lincoln. I hope this work can be started soon, so that we can have some local data on dairying to present to the farmers in a year or two when the dairy industry is taken up. In this connection, one of the most important things to be considered is the question of pasturing. I suspect that a large number of the farmers are going to be pretty skeptical on the pasture question. I think this work at the Farm should be pushed as rapidly as possible and extended as much as possible, so as to secure the necessary information on methods of planting, carrying capacity, methods of improving pastures, fencing, irrigating, etc. I have thought that, under the Demonstration Work Appropriation, some pasture demonstrations in cooperation with farmers might be desirable. Mr. Knorr thinks he can find some farmers who would be willing to cooperate in such an enterprise in case we find it practicable.

It is going to be difficult to find 4 satisfactory grade cows for sale on the Project. We asked several farmers about it, and their statements indicated that what few cows there are, are not for sale. Mr. Knorr, however, heard of two cows for sale last week. We went and saw them, and found one to be apparently satisfactory. The owner wanted \$90 for her - she is two years old - and \$85 for the other, which is six years old. It is likely that the dairy work will be started within the next month.

Mr. Jones is getting well started in the hog work. So far, most of his attention has been devoted to the cholera situation, and to getting acquainted with conditions. We were surprised to find how numerous hogs are on the Project. No

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Conditions at Scottsbluff.

recent estimate of the number of hogs could be obtained, but practically every farm has its herd. Several farmers have over 200 hogs each, and on one place we visited there are about 400 head.

The cholera situation is rather serious. It has not yet been possible for Mr. Jones to get a reliable estimate of the number of hogs lost this year. It is not expected that many more losses will occur this summer; but unless the farmers take pretty careful precautions, there may be a bad outbreak in the fall. The affected herds already reported are pretty widely distributed, so that with conditions favorable to the spread of the disease an epidemic might develop rapidly. One difficulty has been, and to some extent still is, that many farmers refuse to believe that their hogs have cholera. This leads to neglect of sanitary precautions. Mr. Jones is constantly emphasizing the seriousness of the situation, and I think that by the time cold weather comes he will have so impressed the farmers with the necessity of proper sanitation that the disease will be pretty well in hand.

It is desirable that steps be taken to prevent the importation of hogs. In this connection, Mr. Jones says that the State officials have assured him that the necessary quarantine regulations will be made within a short time.

As soon as possible, an automobile should be provided for Mr. Jones' use. I believe Mr. Rommel expects to purchase one this month. If the machine that the State has furnished Mr. Knorr had not been available part of the time, Mr. Jones could not have done nearly as much work as he has. Since reaching Mitchell the first week in May, Mr. Jones has vaccinated about 350 hogs.

I was surprised to find that some hog raisers were ignorant of the presence of cholera on the Project. One farmer on the Dutch Flats thought the disease had disappeared, while the fact is that there are sick hogs within three miles of his place. Under such conditions it is not surprising that many farmers are careless.

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Conditions at Scottsbluff.

When the cholera situation is brought under control, there will be opportunity for a good deal of work looking to the improvement of methods of hog production. Very few of the farms we visited provide satisfactory conditions for hogs. Much of the alfalfa pasture is being badly over-grazed, and few fields are arranged for alternate pasturing. A good many farmers feed no grain with the alfalfa, and there are a lot of other points on which improvement is necessary.

Mr. Jones has arranged to live in Mitchell. The Reclamation Service will furnish him office room, at least for a time. Mr. Weiss is very glad that the work has been started, and is enthusiastic over our plan to conduct the demonstration work on an industrial basis. There are numerous reasons why it would be better to station the field man at the Experiment Farm, and Mr. Jones would prefer to be there, but with the accomodations at present available, it is not possible.

The more I saw of the whole situation, the more I thought of the plan of having the hog expert stationed on the Project. I have no doubt that his work will be much appreciated, and that a great deal of good will result.

We were not able to get any very definite figures on the progress the hog raisers are making; but a few items of interest were picked up. Quite a numner of farmers are raising two litters a year, but there appears to be some doubt as to the value of the practice. The size of the litter this spring has averaged about 7 pigs, on the farms we visited. One farmer on Dutch Flats has just finished fattening 75 hogs. These hogs averaged 113 pounds when the finishing period began, and at the end of a 66-day period, they were estimated to average about 250 pounds. They were finished on soaked ground corn, for which the farmer paid \$1.38 a hundred. The farmer did not know exactly how much he was feeding, but he figured he would clear about 50 cents a hundred on the corn, if the hogs sold for 8 cents. The hogs were to be shipped to Denver.

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Conditions at Scottsbluff.

There are several herds of registered hogs on the Project, and those we saw are in fine shape. The presence of these herds of breeding stock makes it unnecessary to import stock, and this will be of assistance in stamping out the cholera.

The general outlook on the North Platte Project is good. Crop prospects are excellent; the farmers appear to be much interested in getting into livestock industries, and on the whole, the situation is very encouraging.

F. D. F.

Under date of May 30, Mr. Knorr had the following to say concerning the hog situation on the North Platte Project:

"In reporting further the present situation on this Project so far as the hog cholera is concerned, we have had no further outbreak up to the present time. In the past three weeks practically all the herds affected with cholera have been vaccinated. Through the cooperation of Dean Burnett and the Board of Regents, we hope to be able to secure a certain amount of serum from the State plant, and have it stored at Scottsbluff or Mitchell, and keep it there on call. As soon as we get the cholera cleaned up on the Project, Dr. Kigin, the State veterinarian, has promised us that he would quarantine Scottsbluff, Morrill, southern Sioux, and northern Banner counties from shipping in any live hogs that have not been vaccinated, and have been properly immuned for at least four weeks before shipping. Mr. Jones has arranged with Dr. Kigin, Dr. Gain, of the State University, and Dr. Day, to hold four half-day hog institutes at Minatare, Scottsbluff, Mitchell and Morrill. Hog cholera and sanitation are the topics to be discussed."

ESTIMATES FOR FISCAL YEAR 1915.

Farm superintendents will please send in as soon as possible their estimates for the fiscal year

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Estimates for 1915 (continued).

1915. Reference to page 42, Volume III, Weekly Bulletin, dated April 26, 1913, will supply full information concerning the data required in this connection.

PERSONAL

Mr. Farrell plans to reach Washington about the 18th of June.

13, June, 1914.

FIELD NOTES

San Antonio.

During the week ending May 30, the maximum temperature was 88, minimum temperature 67.5, and precipitation .08 inch.

The greater part of the milo, sorghum, cotton, and orchards was cultivated during the week. Several of the plats on the south end of the rotation fields remain too wet to cultivate. All of the cotton on the rotation plats was hoed during the latter part of the week. A part of the farm roads was also graded.

Milo in the thinning experiment on C5 was thinned on the 25th of May. This was somewhat later than it should have been thinned, but owing to the extremely unfavorable weather conditions for the past ten days it was impossible to get in the fields before.

Mr. Cardon left for Austwell on May 26. Mr. Meade, also, made a three days' trip to Austwell during the week.

Umatilla.

During the week ending May 30, the maximum temperature was 82, minimum temperature 38, and precipitation .12 inch.

Grain sorghums and Indian corn varieties were planted in Field C1a, to make a comparison of their respective yields of grain. The Indian corns are usually quite badly damaged by cutworms, while the sorghums are not, so the better varieties are being planted to ascertain if some of the sorghums can be recommended to use in place of corn for grain production.

A variety test of watermelons was planted in Field A4. A process of elimination has been practiced in this work during the past four years, and this year is expected to complete the work of testing varieties.

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FIELD NOTES.

Umatilla (continued).

Mr. Allen made a trip to the Southern Oregon Experiment Station during the week to lay out a distribution system for irrigating the twenty acres of land upon which experiments are being conducted near Talent, in the Rogue River Valley.

Mr. H. K. Dean, who has been away from the Station since October 1, 1913, on leave of absence, resumed his duties on Wednesday, May 27.

Huntley.

During the week ending May 30, the spring planting of all crops was completed. Corn was planted in all of the plats in the alfalfa eradication experiment in the orchard tract. Alfalfa was planted in all of Field C-II, III, IV and V, east of Plat 8 on each series. The remainder of the time was spent in cleaning and repairing irrigation sitches, and the first irrigation of alfalfa in Field A-I, and of the grasses in Field A-II, was started.

In the following table there is given a summary of the amounts of seeds and number of trees distributed among project farmers this season:

Number Farmers	SHADE <u>TREES</u>		POTATOES		WHEAT		BARLEY		OATS	CORN
	Elms & Box El-	Elders	Rural New Yorker	Pringles Champion	Kharkov	Guy Lbs.	New Lbs.	Mayle Zealand	Swedish Select	H.W. Dent
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
46	225	3000	1489	1750	565	205	565	205	500	144



13 June, 1914.

FIELD NOTES.

Huntley (continued).

The table below gives further details regarding the seed and plants distributed, summarized on the preceding page.

	<u>Variety</u>	<u>Number of Farmers</u>	<u>Number or Quantity</u>
Shade Trees	Elm	16	164
	Box El- ders	15	61
Potatoes	Rural New Yorker	10	3000 Lbs.
Wheat	Pringles Champion	9	1489 "
	Kharkov	6	1750 "
Barley	Guy Mayle	6	565 "
	New Zealand	2	205 "
Oats	Swedish Se- lect	2	500 "
Corn	N.W.Dent	3	124 "

In the irrigated rotations field all alfalfa except spring seeding was irrigated. All ditches were cleaned out, and the headlands plowed out, disked and leveled. Volunteer grain was hoed from borders of Plots V-17, 18 and 19.

Weights were taken of the four hogs in Rotation 67 for the third period of ten days.

Individual Weights.

Number	Weight		Daily gain	Total gain for period	Total Gain for 30 days
	May 16	May 26			
1	121.5	128.0	.65	6.5	30.0
2	132.0	137.5	.55	5.5	27.5
3	147.5	152.0	.45	4.5	32.0
4	144.5	148.0	.35	3.5	28.0
Total	545.5	565.5	2.00	20.0	117.5
Average	.....	.....	.50	....	29.37

FIELD NOTES.

Huntley (continued).

Days	Number of hogs	Initial weight	% Daily gain	Total gain per day, lbs.	Net daily return per acre	Pounds per acre per day	Amount grain fed, lbs.
*	30	4	.77	3.92	\$.68	15.68	310
**	10	4	.35	2.00	.12	8.00	110

* April 27 to May 26, inclusive.

** May 16 to May 26, inclusive.

During the first half of the week ending June 6 weather conditions were favorable for field work. The principal work done was the making and repairing of irrigation ditches, and cultivating roadways and headlands. The first irrigation of alfalfa in Field A-III and IV and B-II and III has been completed.

Heavy showers occurred during the last three days of the week, the total precipitation being 1.10 inches.

A great many beets on the Farm and on most parts of the Project are affected by black root. This condition is probably due to weather conditions during the preceding three weeks. The heavy rains kept the ground cold and wet, and later caused the surface to crust badly at about the time the beets were coming up. This may have the effect of leaving a rather light stand in some cases, but is generally considered not very serious.

Mr. F. D. Farrell reached the Station on June 1.

The number of trees injured and winter killed during the past winter is much greater than was apparent earlier in the season. Information concerning the number lost and surviving is given in detail in the following table. Under the heading "Killed or severely injured" are given the numbers of each variety that has been either entirely killed or so badly

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FIELD NOTES.

Huntley (continued).

injured that it will be necessary to replant.

Variety	Number of trees.				%
	Living in fall of 1913	Killed or severely in- jured in win- ter 1913-14.	Alive in spring of 1914.	sur- viving	
(Apples)					
Wolf River	12	9	3		25
Pattens Greening	9	3	6		67
McIntosh	14	5	9		64
Northern Spy	5	5	0		00
N. W. Greening	5	3	2		40
Mann	1	0	1		100
Wealthy	24	4	20		83
Gideon	2	0	2		100
Alexander	3	1	2		67
Mo. Pippin	1	1	0		00
Liveland	3	1	2		67
Stayman Winesap	17	16	1		6
Gano	16	15	1		6
Baldwin	1	1	0		00
Jonathan	1	1	0		00
Early Harvest	1	1	0		00
Malinda	2	2	0		00
G.G. Pippin	1	1	0		00
Walbridge	3	2	1		33
Pewankee	1	1	0		00
Ben Davis	3	3	0		0
Red Astrachan	1	1	0		0
Iowa Blush	2	2	0		0
McMahon	1	0	1		100
Radiant	3	0	3		100
Wagner	1	1	0		0
Iowa Beauty	2	1	1		50
Oldenberg	2	0	2		100
Lowland Raspberry	3	2	1		33
Price Sweet	1	1	0		0
Fameuse	2	0	2		100

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FIELD NOTES.

Huntley (continued).

Variety	Number of Trees.				% surviving
	Living in fall of 1913	Killed or severely injured in winter 1913-14	Alive in spring of 1914		
Soularde	1	0	1		100
Brilliant	1	1	0		0
Longfield	2	0	2		100
Yellow Transparent	3	1	2		67
University	3	1	2		67
Peerless	3	0	3		100
Hibernal	3	0	3		100
Tetofski	3	2	1		33
All Apples	<u>162</u>	<u>88</u>	<u>74</u>		<u>46</u>

(Crab Apples)

Alaska	2	0	2	100
Lymans Prolific	2	0	2	100
Dartt	7	1	6	86
Excelsior	2	0	2	100
Hyslop	2	0	2	100
Minnesota	2	0	2	100
Florence	2	0	2	100
Whitney	2	0	2	100
Transcendent	2	0	2	100
All Crab Apples	<u>23</u>	<u>1</u>	<u>22</u>	<u>96</u>

(Sweet Cherries)

Bing	6	6	0	0
Nameless	2	2	0	0
Tartarian	2	2	0	0
Windsor	2	2	0	0
Rockport	1	1	0	0
Yellow Spanish	2	2	0	0
All Sweet Cherries	<u>15</u>	<u>15</u>	<u>0</u>	<u>0</u>

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Variety	Number of Trees				% surviving
	Living in fall of 1913	Killed or severely injured in winter 1913-14.	Alive in spring of 1914.	sur-	
(Sour Cherries)					
Late Kentish	2	1	1		50
Montmorency Ord.	1	1	0		0
May Duke	7	6	1		14
Large Montmorency	5	4	1		20
Richmond	1	1	0		0
Ostheim	1	1	0		0
Homer	<u>2</u>	<u>1</u>	<u>1</u>		<u>50</u>
All sour cherries	<u>19</u>	<u>15</u>	<u>4</u>		<u>21</u>
(Plums)					
Abundance	8	4	4		50
Hammer	2	0	2		100
Shippers Pride	1	0	1		100
Wyant	2	0	2		100
Terry	2	0	2		100
Burbank	2	2	0		0
Weaver	2	1	1		50
Stoddard	1	0	1		100
De Sota	2	0	2		100
Wolf	2	0	2		100
German Prune	2	1	1		50
Rolling Stone	1	0	1		100
Ocheda	1	0	1		100
Brittlewood	2	1	1		50
Surprise	5	0	5		100
Compass Cherry	2	0	2		100
Aitkin	4	0	4		100
Forrest Garden	2	0	2		100
Hawkeye	1	0	1		100
Jewell	<u>6</u>	<u>6</u>	<u>0</u>		<u>0</u>
All Plums	<u>50</u>	<u>15</u>	<u>35</u>		<u>70</u>

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FIELD NOTES

Huntley (continued).

Variety	Living in fall of 1913	Killed or severely in- jured in win- ter 1913-14	Alive in spring of 1914.	% sur- viving
(Summary)				
Apples (39 vars.)	162	88	74	46
Crab Apples (9 vars.)	23	1	22	96
Sweet Cherries (6 vars.).....	15	15	0	0
Sour Cherries (7 vars.).....	19	15	4	21
Plums (20 vars.)....	50	15	35	70

Plat V-30 (irrigated rotation field) potatoes (rye plowed under) was irrigated June 3, two days after planting.

Weights were taken of the four hogs in Rotation 67, for the fourth period of ten days.

Individual Weights.

Number	Weight		Daily gain	Total gain for period	Total gain for 40 days
	May 26	June 5			
1	128.0	135.5	.75	7.5	37.5
2	137.5	144.0	.65	6.5	34.0
3	152.0	160.0	.80	8.0	40.0
4	148.0	156.0	.80	8.0	36.0
Total	565.5	595.5	3.00	30.0	147.5
Average.....75	36.9

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FIELD NOTES.

Huntley (continued).

	Number Days of hogs	Initial weight	% Daily gain gain, lbs.	Total Daily gain per per acre	Net daily return per acre	Pounds per acre	Amount grain fed, lbs.
*	40	4	.71	448 3.69	\$.61	14.75	420
**	10	4	.50	565.5 3.00	.40	12.00	110

* April 27 to June 5, inclusive.

** May 26 to June 5, inclusive.

THE RELATION BETWEEN COLOR VARIATION
AND MOISTURE CONTENT ON WHEAT PLATS OF
FIELD K.

It was observed recently that considerable color variation existed on the Plats 7 and 8, of Series K-II. Both plats are continuously cropped to spring wheat. Plat 8 receives the same treatment as Plat 7, except that the straw is returned to the land each year before plowing. The wheat on Plat 7 was uniformly of a light green color, while that on Plat 8 had considerable color variation. Most of the wheat on Plat 8 was of a lighter color than that on Plat 7. The west two-thirds of Plat 8 was yellower than the east third, and the whole plat was dotted with very dark green areas, ranging from two to five feet in diameter.

Soil moisture determinations were made June 3 to ascertain whether or not the color variations were associated in any way with the moisture content of the soil.

The method of sampling was as follows: Six regular cores were taken on each plat to depths of six inches, one foot and two feet. On Plat 8, four additional cores were taken from the very dark areas mentioned above. The results are stated on the following page.

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Relation Between Color Variation and Soil Moisture Content (continued).

Plat	Treatment	Depth	PERCENT MOISTURE.						Average
			1 %	2 %	3 %	4 %	5 %	6 %	
II-7	Wheat (cont.)	6"	14.	18.	17.	20.	18.	20.	17.8
II-8	Wheat (cont.) (straw ret.)	6"	22.	20.	19.6	18.8	19.8	20.5	20.1
II-8	Dark Areas	6"	15.8	16.9	15.7	16.5			16.2
II-7	Wheat (cont.)	6"-12"	14.3	22.1	18.2	24.6	20.2	20.6	20.0
II-8	Wheat (cont.) (straw ret.)	6"-12"	18.	19.4	27.3	21.2	18.3	19.5	20.6
II-8	Dark Areas	6"-12"	19.5	21.3	15.7	15.5			18.0
II-7	Wheat (cont.)	12"-24"	15.2	19.6	18.5	19.6	21.	21.7	19.3
II-8	Wheat (cont.) (straw ret.)	12"-24"	17.	20.	23.8	18.5	17.2	16.	18.7
II-8	Dark Areas	12"-24"	13.4	19.6	16.5	12.7			15.5

Average for all depths:

II-7.....	19.0
II-8.....	19.8
(Dark Area).....	16.6

The above figures indicate that the surface six inches of Plat 8 contains a higher percent than Plat 7. Lower depths and average of all depths show no considerable difference. Dark areas are uniformly lower at all depths.

Truckee-Carson

During the week ending May 30 the maximum temperature was 92, minimum temperature 36, and precipitation .04 inch.

Twenty-five varieties of corn and one plat of feterita were planted in duplicate on the Farm of A. R. Merritt.

The second application of two tons of gypsum per acre was applied to Plats Y-1, 3, 4, 6, 7, 9, 10, 12, 13 and 15. The first application which had been applied during the previous week, was plowed under before putting on the second application.

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FIELD NOTES.

Truckee-Carson (continued).

The squash, pumpkin and cucumber varieties were planted and the pepper, egg-plant and tomato varieties were transplanted from the green-house to Field A1.

Following are results of analyses of ten borings of soil from Plat Y-15, the figures being the averages obtained from the three borings:

Depth	Total Salts	Na_2CO_3	NaHCO_3	NaCl	Na_2SO_4
1st foot	.2960	.0199	.0674	.0302	.0330
2nd foot	.2660	.0273	.0454	.0243	.0245
3rd foot	.2252	.0268	.0307	.0221	.0310
Three feet	.2624	.0241	.0478	.0245	.0437

A circular letter containing suggestions looking to the eradication of the Russian Thistle in Churchill County has been distributed among the water-users of the Truckee-Carson Project.

INVENTORY STATEMENTS.

Blanks for the preparation of the 1914 inventory statement have been mailed to the various farms. Separation of the statement into Schedules A and B has been done away with, and the items should be listed alphabetically under one schedule.

The inventory statements should be sent in promptly upon receipt of the monthly statement for June.

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20 June, 1914.

FIELD NOTES.

Truckee-Carson.

During the week ending June 6 the maximum temperature was 91, minimum 34; precipitation, 0.075.

Japanese millet was seeded on plats D-2, 4, 6, 8, 10, 12, 14, and E 5, 8.

Alfalfa was cut on F 1-2-3-4-5-6-7, D 13; H 1-2, 10, 12, 13, 14, 15, 16, 17, 21, 22.

The beet varieties on the Churchill Creamery Farm were thinned and weeded.

The gardens and field D 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14 were irrigated.

Belle Fourche.

During the week ending June 6 the maximum temperature was 90, minimum 44; precipitation, 0.5 inch.

The alfalfa on O & P and K was irrigated.

The barley in rotation 66, A-II-25, the continuous cropped barley, A-II-47, and all the grain plats in A-I-except A-I-18 were irrigated.

The rye on the dry land rotations was plowed on Saturday.

All the corn and potatoes in the irrigated rotations and the corn in Field P were cultivated.

The roads in Fields B, C, G, and F have been graded and those in A partly finished.

The sorghum and millet varieties were planted and the remainder of Field O was planted to corn.

The remainder of the time was used in building irrigation ditches and weeding.

Small rains nearly every day interfered with getting the field work done.

On Saturday some hail fell, and garden crops were damaged to some extent, but no serious damage was done to grain or alfalfa.

20 June, 1914.

FIELD NOTES.

Scottsbluff

During the week ending June 6, the weather was very favorable for small grains and beets. A small shower each day kept the soil moist and in good shape.

Two varieties of barley are beginning to head out. The barley is about 14 inches high and in excellent condition, and so far has not received any irrigation.

The wheat and oats are making splendid growth, in fact, the growth is so luxuriant that lodging is feared when the grain begins to head out.

All of the potatoes are coming up, and indications point to a good stand.

Thinning of sugar beets is about half completed; a better stand than last year is expected.

During the great part of the week the men were busy cleaning roads and alleys. It is hoped to complete this work before hay harvesting starts.

Mr. Potter, of this Department, arrived at the Station June 3, and will work on corn smut during the summer. Mr. Gates, of the State University, arrived at the Station on June 5, and will continue his study of alfalfa pollination. Dr. Day, veterinarian for the State Sanitation Board, visited the Station during the week.

A very high wind and sand storm on the night of June 6 caused a great deal of damage to growing crops, cutting off many beet fields.

During the week ending June 13, there was .64 inch precipitation. This came in two torrent showers and the run-off was very large. The first shower was preceded by hail which did some damage. Six hail storms have occurred during the spring; no single one of these has done



20 June, 1914.

FIELD NOTES.

Scottsbluff (continued).

great damage, but their cumulative effect has been noticeable.

On June 8 alfalfa hay cutting was begun. By the end of the week all of the alfalfa had been cut except that on Field K. The rain interfered seriously with hay making.

The small grain varieties have all been irrigated; also, the small grain on Field K.

All of the potatoes were cultivated during the week; also, the greater part of the corn.

On account of the early hay season the weeds are getting a considerable foothold in the fields. As soon as the hay is put in the stack an effort will be made to remove them.

Yuma.

During the week ending May 30, the maximum temperature was 102, minimum temperature 52, and greatest daily range 45.

Alfalfa was harvested from Borders B-9 to 17, D-18, and 20 to 27, inclusive. D-18 and 20 to 27 is new, spring-seeded alfalfa to be conducted as a "Time of Cutting Experiment". This was the first clipping and all harvested alike. The next cutting will be handled in line with the experiment. A very good stand has been secured on these borders for spring seeding.

Durango cotton was replanted on A-6, 7, 8, & D-14. The small triangular corner of land on the southeast of the Farm, lying outside of the fence, which has in the past been occupied by Mexicans, was leveled in preparation to planting a Eucalyptus block.

Forty pounds of Deglet Noor date seed were distributed through this Station to local settlers.

The Station's meteorological instruments were moved to a location on A-10₃, where an unobstructed air circulation could be had. In the old location there was much interference on account of the Farm buildings.

20 June, 1914.

FIELD NOTES.

Yuma (continued).

All orchards were irrigated during the week (dates, figs and deciduous).

The total irrigation for the week was 36 acres.

The following yields were secured from the E series, 1 to 6, in a "Time of Cutting Experiment", from the first cutting, and are as follows:

Plat number	Area, acres	Date of cutting	Yield, field-cured hay	Percent air-dry hay.	Computed air-dry yields		
					Plat	Pounds per acre	Tons per acre
(Peruvian, 12 lbs. per Acre--399.625 plants per acre)							
1	.221	4/18	335	78.8	264	1193	.597
2	.218	4/25	410	88	361	1653	.827
3	.221	5/2	210	94.7	199	901	.45
4	.243	5/9	340	97.7	332	1367	.683

(Peruvian, 15 lbs. per acre-- 394.875 plants per acre)							
5	.235	4/18	325	84.2	273	859	.429
6	.23	4/25	395	88	348	1510	.755
7	.225	5/2	240	95.66	230	1022	.511
8	.25	5/9	444	90.5	401	1602	.801

(Chilian, 18 lbs. per acre--349.000 plants per acre)							
9	.239	4/18	388	93.43	362	1515	.758
10	.234	4/25	400	83.8	335	1431	.715
11	.24	5/2	370	94.51	350	1458	.729
12	.259	5/9	472	92.04	435	1679	.839

These yields all show very markedly the unevenness of the soil of these plats.

The earliest mature watermelons in the Valley were picked last week, being the first on adjacent markets.

The Colorado River registers 26.7 feet at Yuma, and the seepage in the low lands is increasing daily. Already, the traveled roads from Bard to Yuma are blocked and boggy, making it necessary to drive on the ditch

20 June, 1914.

FIELD NOTES.

Yuma (continued).

banks. Some alfalfa fields are yellowing from the high ground water plane. A flood crest is predicted at Yuma on June 8.

During the week ending June 6, the maximum temperature was 99, minimum temperature 55, and the greatest daily range 43.

All orchards on the farm were cultivated; also, grain sorghum plantings, row plantings of Sudan grass, and cotton and various nursery plats on the A series.

Two additional laborers were employed to hoe ditches, orchards, etc. Alfalfa was chopped from cotton on A-6 and 7. June plantings of grain sorghum and broom corn were made on A-1 and 2. May plantings of grain sorghums on D-8 to 10 were thinned. Alfalfa was harvested from A-135, 6 and 7, and Tunis grass from D-38.

All plants in seedling date nursery on A-14₃, variety Menakher, were pruned of fronds in preparation of transplanting. Thirty-four of these were transplanted along roads 1, 2 and 3.

The Colorado River continues to rise slowly. On the California side along the levee stock has been removed from the seeped farms, and a few families are now moving out as the water is dangerously near the top of the levee in places. The Reclamation Service is working continuously with rock trains, and believe that the levee will be held against any ordinary rise of the river. Seepage has not reached beyond the open ditch drains, but tile drains near the levee have caved in in various places until the drainage in that section is cut off.

Twenty-six acres were irrigated during the week.

20 June, 1914.

FIELD NOTES.

Huntley.

The following table gives the percentage daily gains of the individual hogs and of the lot in Rotation 67, Huntley Experiment Farm, for the ten-day period from May 16 to May 26, and the thirty-day period from April 27 to May 26.

Number of hog	Percentage Daily Gain	
	May 16 to May 26	April 27 to May 26
1	.51	.89
2	.40	.74
3	.29	.79
4	.23	.70
Lot	.36	.78

HOGS ON ALFALFA AT SCOTTSBLUFF.

Mr. Knorr has reported on the weights of the hogs on alfalfa pasture on the Scottsbluff Experiment Farm for two periods, the first period covers the time from May 4 to May 19, and the second period from May 19 to June 4. During this period a number of the hogs died from cholera, and some of them have been replaced; others have apparently been affected somewhat by the disease, and their growth has been slow, and in some instances they have lost weight. This difficulty with the hog cholera has made the early results from these experiments very irregular, and it is hard to draw satisfactory conclusions from the comparative experiments. The data secured from the work so far, however, has some value as indicating the behavior of different individuals, and in the following table initial and final weights are given for each individual for the month on which the hogs have been on pasture, together with the percentage daily gain for each of the periods, the first period of fifteen

20 June, 1914.

FIELD NOTES.

Huntley (continued).

days, and the second period of sixteen days.

Table showing the initial and final weights and the percentage daily gain for two periods reported from the hog pasturing experiments on the Scottsbluff Experiment Farm.

Rotation 65.

Hog No.	Weight		Percentage Daily Gain	
	May 4	June 4	May 4-19	May 19-June 4
54	110	143	.91	.80
51	98	127	.91	.80
52	102	131	.63	.98
55	102	97	*	*
53	106	135	.77	.80
126	**51	62	--	1.22
91	52	Died 6/4	*	--

* Lost Weight.

** Added May 19.

Lot 1. Alfalfa pasture; no grain

85	116	124	*	.64
57	74	Died 5/27	*	--
58	94	107	.48	.36
59	74	Died 6/3	*	--
60	139	155	.46	.24
133	**50	54	--	.96

* Lost weight.

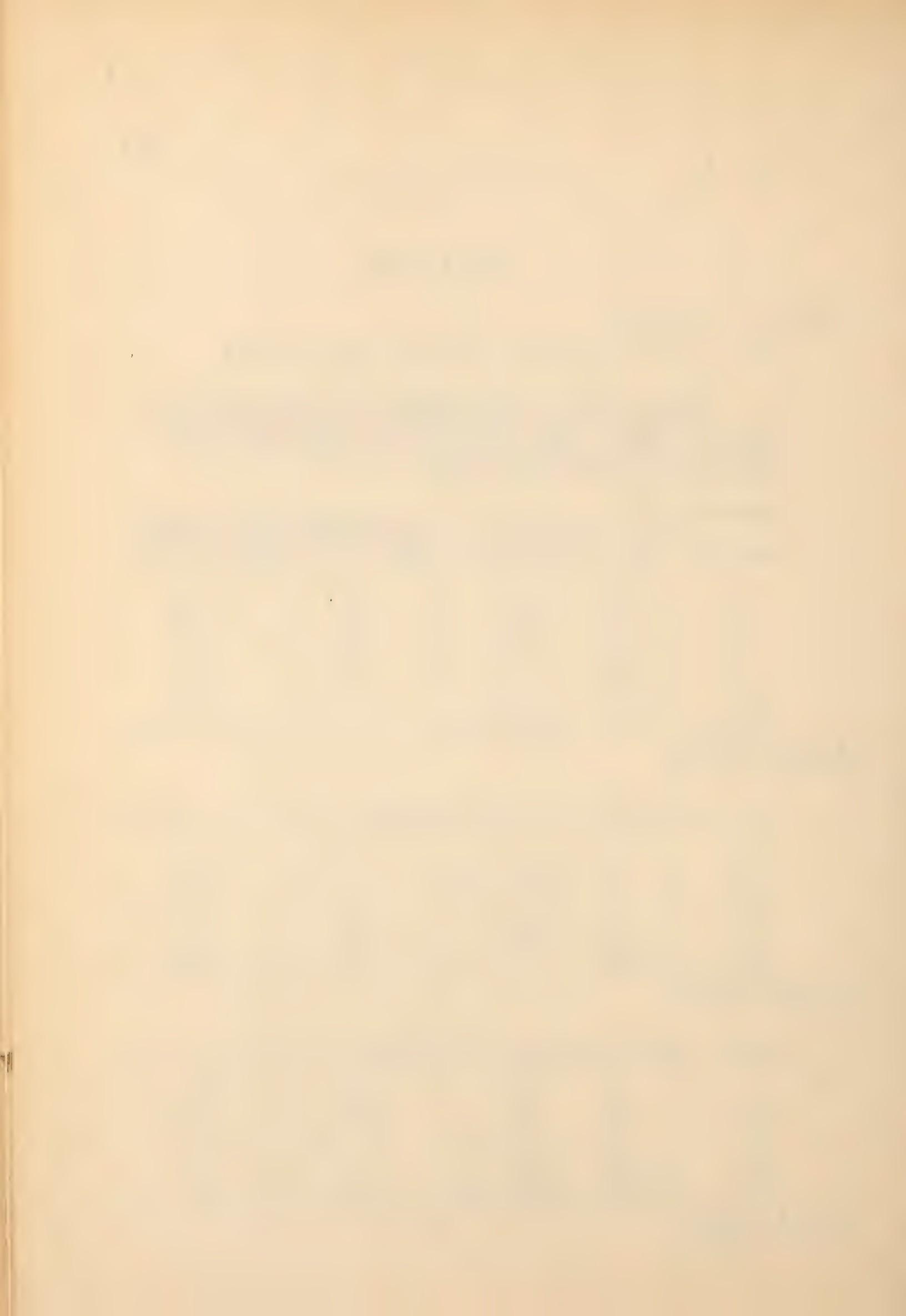
** Added May 27

Lot 3. Alfalfa pasture; 1% corn.

61	80	102	.48	1.06
65	96	122	.92	.64
64	95	92	*	*
69	81	Died 6/3	0	--
128	**187	205	--	.57
62	146	Died 5/15	--	--

* Lost weight.

** Added May 19.



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FIELD NOTES.

Huntley (continued)

Lot 3. Alfalfa pasture; 3% corn.

Hog No.	Weight		Percentage May 4-19	Daily Gain May 19-June 4
	May 4	June 4		
63	100	133	1.10	.75
66	79	116	1.30	1.25
67	81	Died 6/4	*	--
68	102	140	1.09	.96
70	137	175	.90	.72
95	66	Died 5/27	*	--
134	**59	74	--	2.85

* Lost weight.

** Added May 27

Lot 4. Alfalfa pasture; 3% ground barley.

72	67	77	0	.80
73	94	122	.80	.88
74	110	153	1.30	.93
75	98	123	.60	.88
88	132	171	.80	.86
92	51	66	0	1.50

Lot 5. Alfalfa pasture; 2% corn.

71	132	162	.60	.74
76	69	91	1.00	.80
78	85	109	.80	.80
80	137	165	.90	.55
89	71	82	*	1.31
131	**54	67	--	1.35
93	52	Died 5/15	--	--

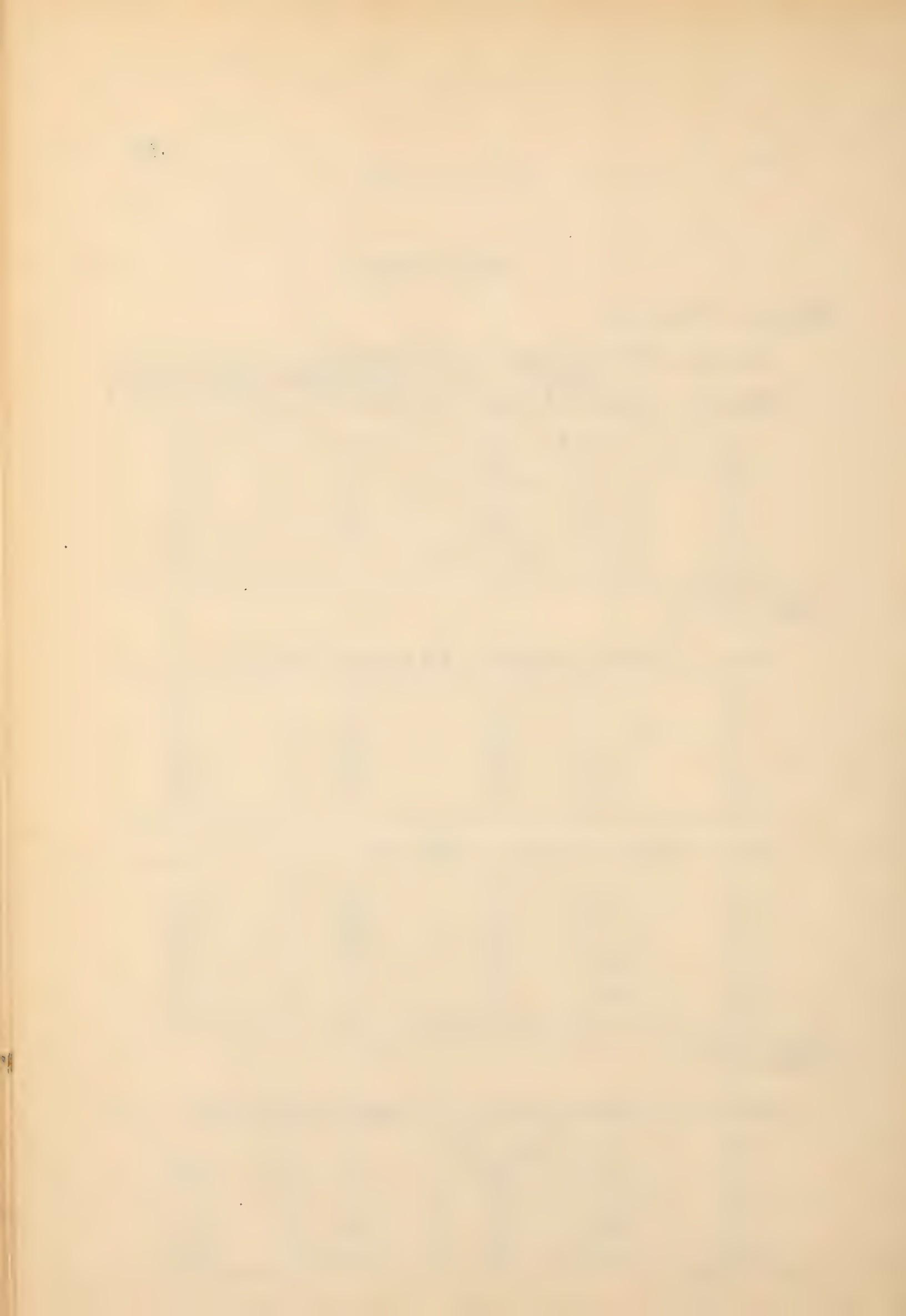
* Lost weight

** Added May 19

Lot 6. Alfalfa pasture, 3 pastures; 2% corn

56	90	Died 6/3	*	--
77	93	129	1.30	.88
79	63	52	*	*
83	162	201	1.05	.36
84	91	83	*	*
94	52	80	1.20	1.60

* Lost weight.



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FIELD NOTES.

Huntley (continued).

Lot 7. Alfalfa pasture, 1 pasture; 2% corn

Hog No.	Weight		Percentage Daily Gain	
	May 4	June 4	May 4-19	May 19-June 4
82	103	133	.97	.73
86	100	129	1.00	.61
87	66	Died 6/2	0	--
96	#159	197	1.04	.49
132	**60	74	--	1.31
81	71	Died 5/17	--	--

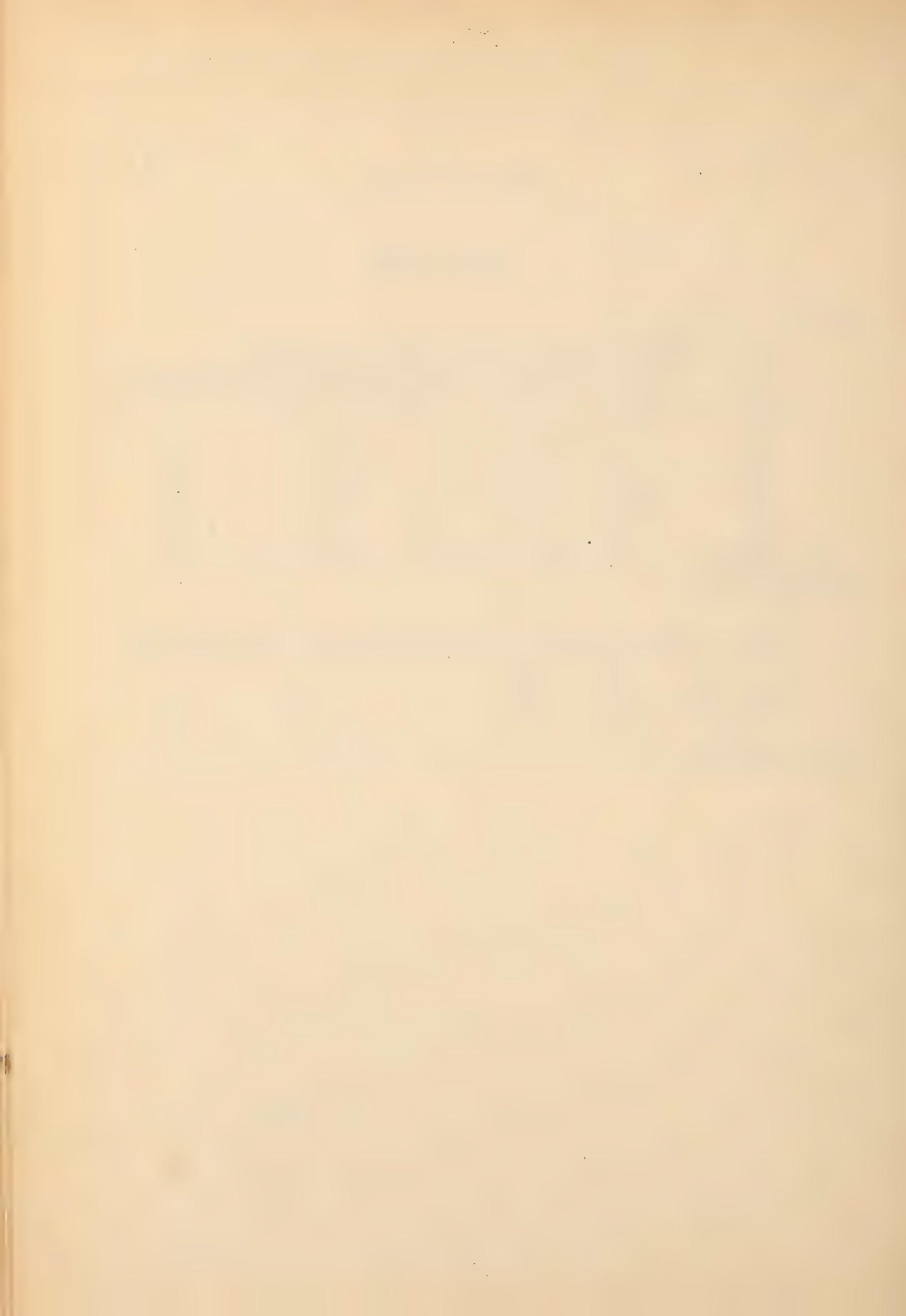
** Added May 19.

Weighed May 6.

Lot 8. Old Sows and Pigs, Alfalfa Pasture; 2% corn

Big Sow	416	365	*	*
Small Sow	286	266	*	*
14 Small Pigs	164	444	3.31	3.20

* Lost weight.



27 June, 1914.

FIELD NOTES.

San Antonio.

During the week ending June 13 the maximum temperature was 92, minimum 65; greatest daily range, 37. There has been no rain since June 2, so that field work has been continuous during the last two weeks.

All crops have been cultivated and practically all have been weeded.

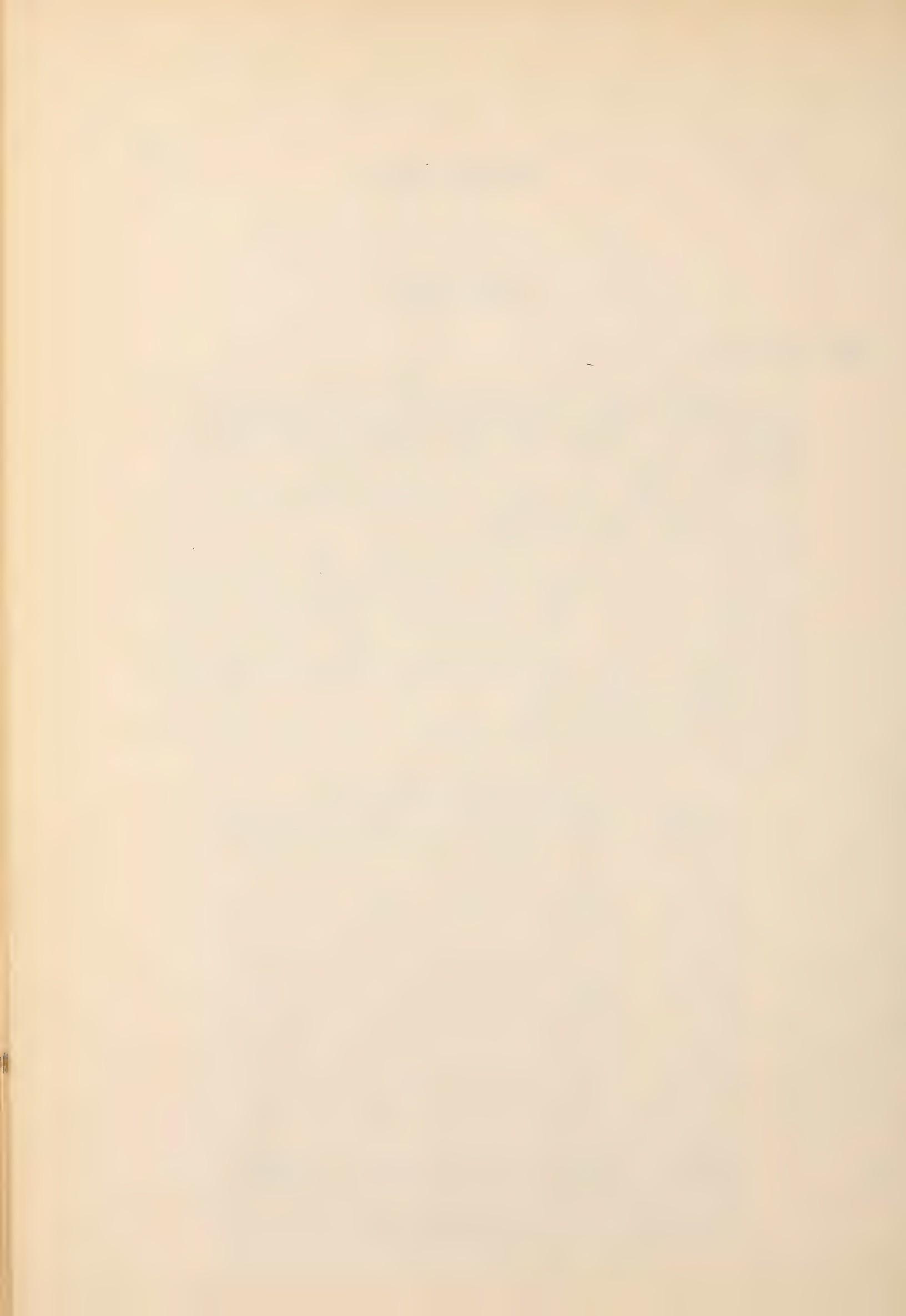
Orchards and fallow land have also been cultivated.

All farm sorghum and Johnson grass have been cut for hay; the hay raked and a large part of it cocked.

Canada field peas and oats were threshed June 11 and 12. The oat yields were rather disappointing, being rather low.

The yields of oats from the rotation plats are shown in the following table.

Plat number	Yield per acre,			Per cent of grain
	Straw pounds	Grain pounds	Grain bushels	
A4-6	2520	528	16.5	21.0
A4-14	2680	792	24.8	29.6
A4-18	2524	740	23.1	29.3
A5-10	2692	420	13.1	15.6
A5-14	2288	416	13.0	18.2
A5-18	2108	580	18.1	27.5
A6-15	744	136	4.3	18.3
B5-18	1788	404	12.6	22.6
Average	2168	502	15.69	22.76



27 June, 1914.

FIELD NOTES.

San Antonio (continued).

The oats were very light and of poor quality, partly as a result of weathering.

The remainder of the oats cut for hay were hauled and weighed. The yields are shown in the following table.

Plat number	Pounds per acre	Tons per acre
A5-2	3768	1.88
A5-5	3288	1.64
A6-6	4400	2.2
A6-7	2336	1.17
A6-9	2112	1.06
A6-11	1808	.90
A4-19	2040	1.02
B5-7	1568	.78
Average	....	1.33

The oats from plats A5-2, A5-5, and A6-6 were handled before the heavy rains. The remaining plats were out during the long spell of wet weather and were so damaged by weathering that they were thrown on the compost heap. The long weathering also lessened the yield of cured hay very much, because the oats were handled so many times that much shattering occurred.

Although the oat crop was very promising early in the season and the plants grew large, rust, lodging and unfavorable weather conditions at harvest combined to reduce the yield.



27 June, 1914.

FIELD NOTES.

San Antonio (continued).

The oats in the pasturing experiment were also threshed, and the results of this work will be written up in detail and reported upon at an early date.

Soil samples were taken in corn, milo, sorghum, and in the cultivation experiments on B4.

Cotton on the rotation plats was thinned on June 8, the plants being left about 8 inches apart in the row.

Milo is heading at this time, and as the sorghum midge has not yet appeared there will be a good crop again this year.

Corn is also in silk and from present indications there will be the heaviest crop that has been harvested since the station was established.

Messrs. Hastings and Meade returned from a two days' trip to Boerne on the 13th.

Belle Fourche.

During the week ending June 13 the maximum temperature was 84, minimum 48; precipitation, 1.10.

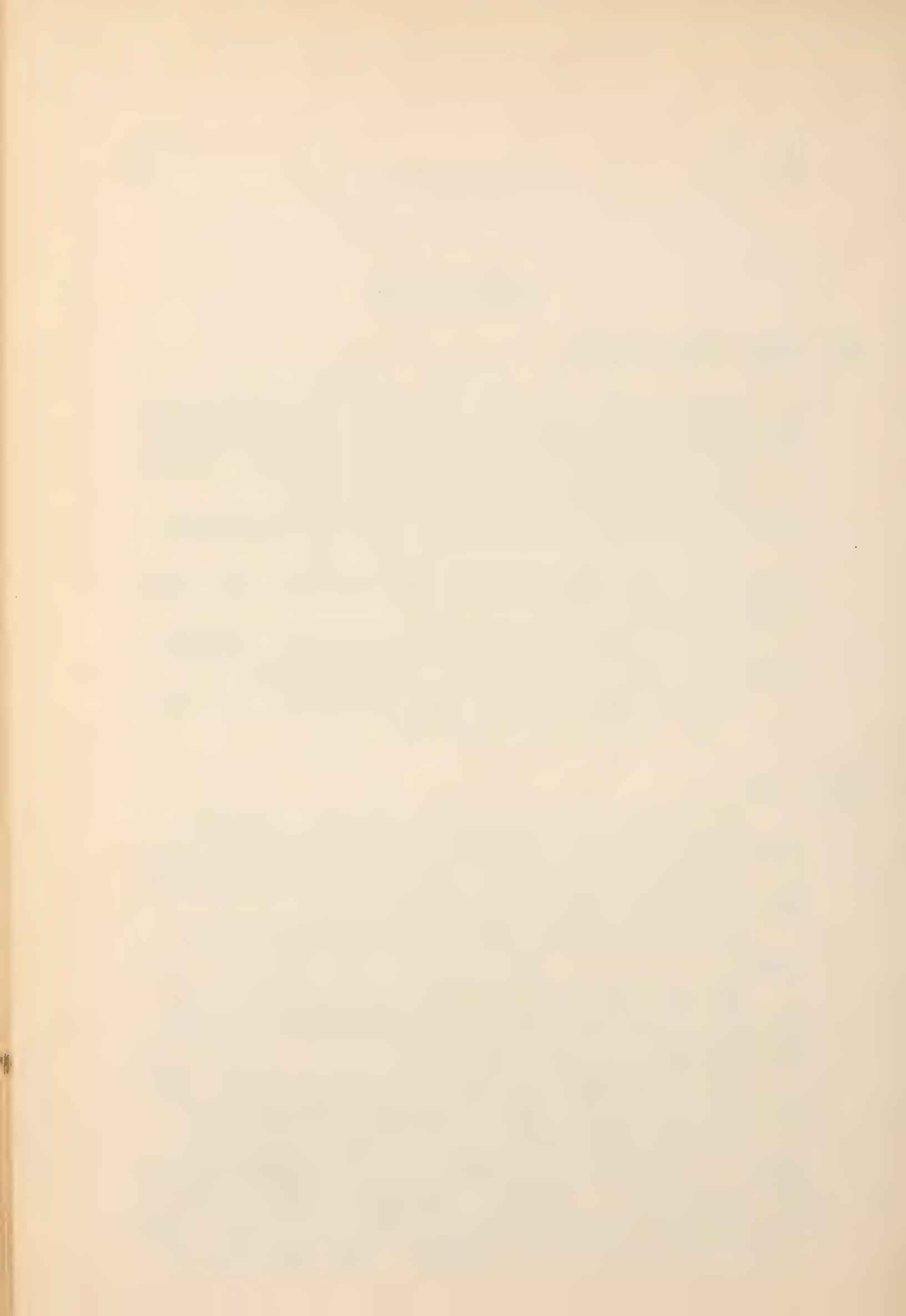
The corn and potatoes in the dry land rotations were cultivated and the irrigated forestry was gone over with the spring tooth harrow.

The thinning of beets in the irrigated rotations commenced on Wednesday and was about half completed.

No field work was done during the latter part of the week, due to rains. The remainder of the time was used in building turnouts and culverts and in installing some of them.

Mr. Farrell arrived at the station on the 10th, Mr. Burr visited the station on the 12th, and on the 13th Mr. Wentz arrived to take up his duties.

On June 11th counts were made of the alfalfa plants in the rate-of-seeding test, which was planted May 7, 1914. The plants in four areas, each 3.3 feet square, were counted. Plants are still coming up on all the plats, so that another count will have to be made later in the season. The following ta-



27 June, 1914.

FIELD NOTES.

Belle Fourche (continued).

ble gives the results of the count made June 11. The percentage of seeds producing plants is calculated on the basis of 225,000 seeds per pound.

Plat number	Rate of seeding. pounds per acre	Plants per acre on June 11	Percentage of seeds producing plants
1	2.5	145,000	26
2	3.0	229,000	34
3	4.5	283,000	28
4	6.0	362,000	27
5	8.0	429,000	24
6	10.0	411,000	18
7	11.5	549,000	21
8	13.0	636,000	22
9	15.0	681,000	20
10	16.5	763,000	20
11	18.5	893,000	21
12	20.5	958,000	21
13	22.5	1,005,000	20
14	25.0	1,208,000	21
Average	12.6	611,000	22

The four hogs on alfalfa pasture in rotation 65 were weighed the second time on June 13. The following shows the gains made since May 20.

Number of days	Number of hogs	Weights		Gain			Corn fed	Pounds pork per acre per day
		initial	final	Total	% daily	per day per hog		
* 12	6	620	704	84	1.06	1.16	230	28.0
** 12	4	462	532	70	1.17	1.45	200	23.2

* May 20 to June 1.
** June 1 to June 13.



27 June, 1914.

FIELD NOTES.

Belle Fourche.

An error was made in reporting the results of the weighing made June 1, in connection with the net daily return per acre. In the calculation made June 1 the area of pasture considered was 1/8 acre instead of 1/4 acre, and the net returns reported were therefore double what they should have been. The correct figures for the first 12 days are as follows: Value of gains at 7 cents, \$5.88; cost of corn fed, at \$1.70 per cwt., \$3.91; net return from 1/4 acre, \$1.97, or \$7.88 per acre for the period. This is equal to a net daily return of 65 cents per acre.

The corresponding figures for the second 12-day period are: 70 pounds gain at 7 cents, \$4.90; 200 pounds corn at \$1.70, \$3.40; net return from 1/4 acre, \$1.50, or \$6.00 an acre, which equals a net daily return of \$0.50 an acre.

An error was made in feeding the corn in both periods. During the first period the hogs received 3.1 per cent and during the second period they were given 3.6 per cent. From now on the hogs will receive the 2 per cent corn ration according to the plan.

Truckee-Carson.

During the week ending June 13 the maximum temperature was 82, minimum 33; precipitation, 0.07 in.

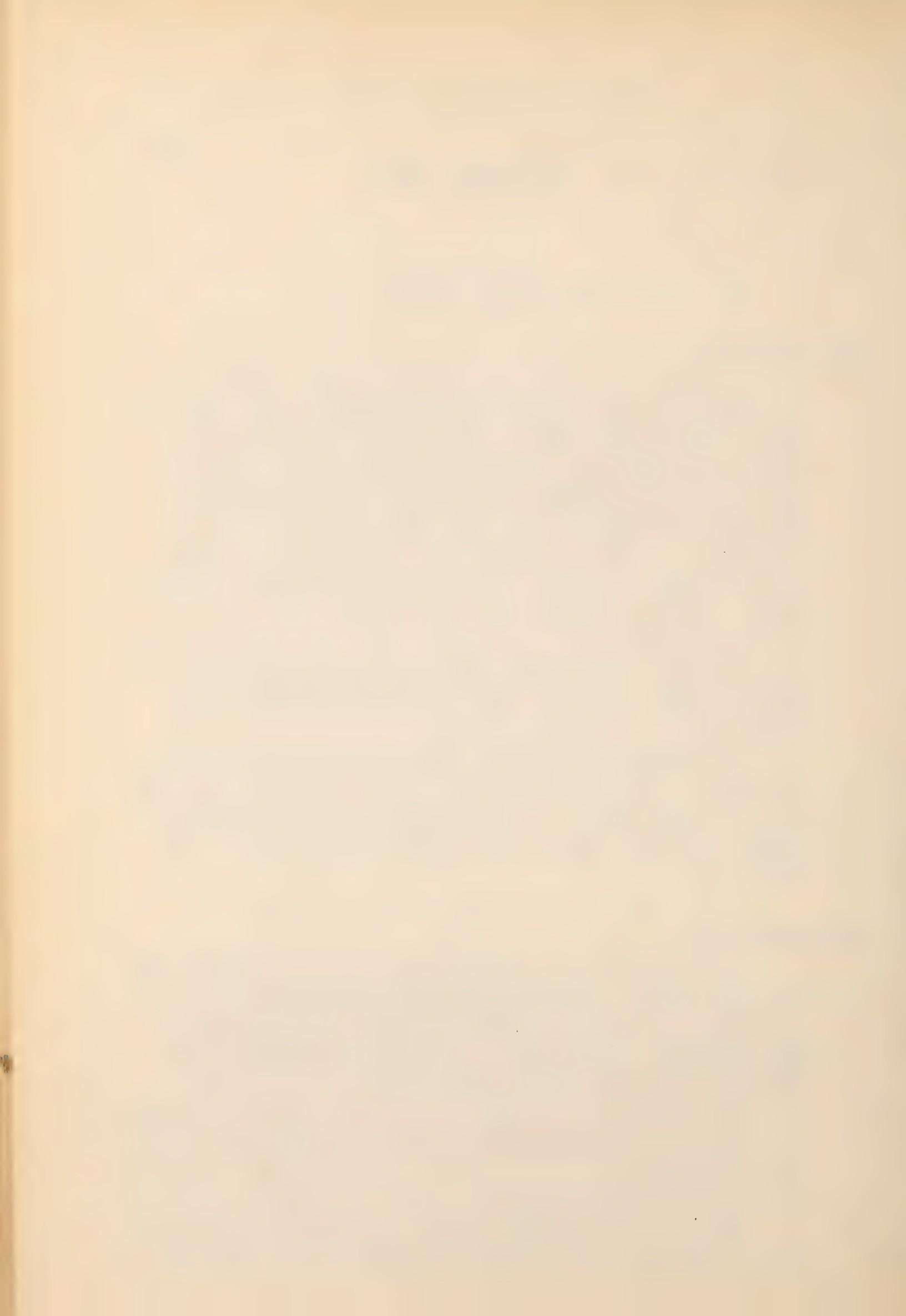
Hog millet and Japanese millet were seeded on experimental plats on the Churchill Creamery Farm, and Japanese millet was seeded on the Experiment Farm on plats H23 to 29, inclusive.

The beets in the beet varieties on the Churchill Creamery Farm were thinned.

The rye from H2 and the alfalfa from all fields were harvested.

The rye was cut for hay and yielded at the rate of 2760 pounds per acre.

The alfalfa, sweet clover and weeds were cut by hand from the ditch banks and levees over the farm.



27 June, 1914.

FIELD NOTES.

Truckee-Carson (continued).

The yield of the alfalfa plats was as follows:

Plat number	Area, acres	Yield per acre, pounds
A5.....	.23	6350
F1.....	.54	2178
F2.....	.45	890
F3.....	.54	1990
F4.....	.54	2317
F5.....	.54	3700
F6.....	.54	3890
F7.....	.54	1526
D13.....	.43	2968
G2.....	.27	1740
Z.....	1.50	1660
E1.....	.51	2825
E2.....	.51	4080
E3.....	.51	2865
H1.....	.66	4700
H4.....	.36	3336
H5.....	.30	3587
H6.....	.24	3915
H7.....	.19	3550
H10.....	.45	7480
H11.....	.44	1363
H12-13-14....	1.04	5020
H15.....	.37	4260
H16.....	.43	4690
H17.....	.52	4180
H19.....	.60	4250
H20.....	.60	2125
H21.....	.39	1640
H22.....	.39	2820
Total.....	14.63	93185
Average.....	.505	3213



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FIELD NOTES.

Truckee-Carson (continued).

Following are results of ten borings of soil from Plats Y-13 and Y-14, the figures being the averages obtained from the three borings.

Y-13

Yuma

During the week ending June 13 the maximum temperature was 103, minimum 51; greatest daily range 43. The maximum of 103 was recorded on three successive days.

Cotton, hemp, and grain sorghums were cultivated.

Orchards B-23 to 32 were disked.



27 June, 1914.

FIELD NOTES.

Yuma (continued).

The second cutting of alfalfa was harvested from A135, 6, and 7; B18, D17, and the latest plats of second cutting of time-of-cutting test from E1 to 6. Air-dry weights are not yet completed.

Four outside 4-horse teams were employed for three days at the close of the week in leveling new land on the north end of B series. This land is very rough, with long hauls, and perhaps is the most expensive portion of the farm to level.

Three laborers were busy throughout the week with general hoeing of crops and of weeds and Bermuda grass from ditches and levees.

A portion of the pomegranate plantings on C18 were sprayed with 4-4-50 solution of Bordeaux mixture as a possible check to the pathological injury of the fruit when maturing that developed so abundantly last season.

Date palms on A-21 and 22 were pruned.

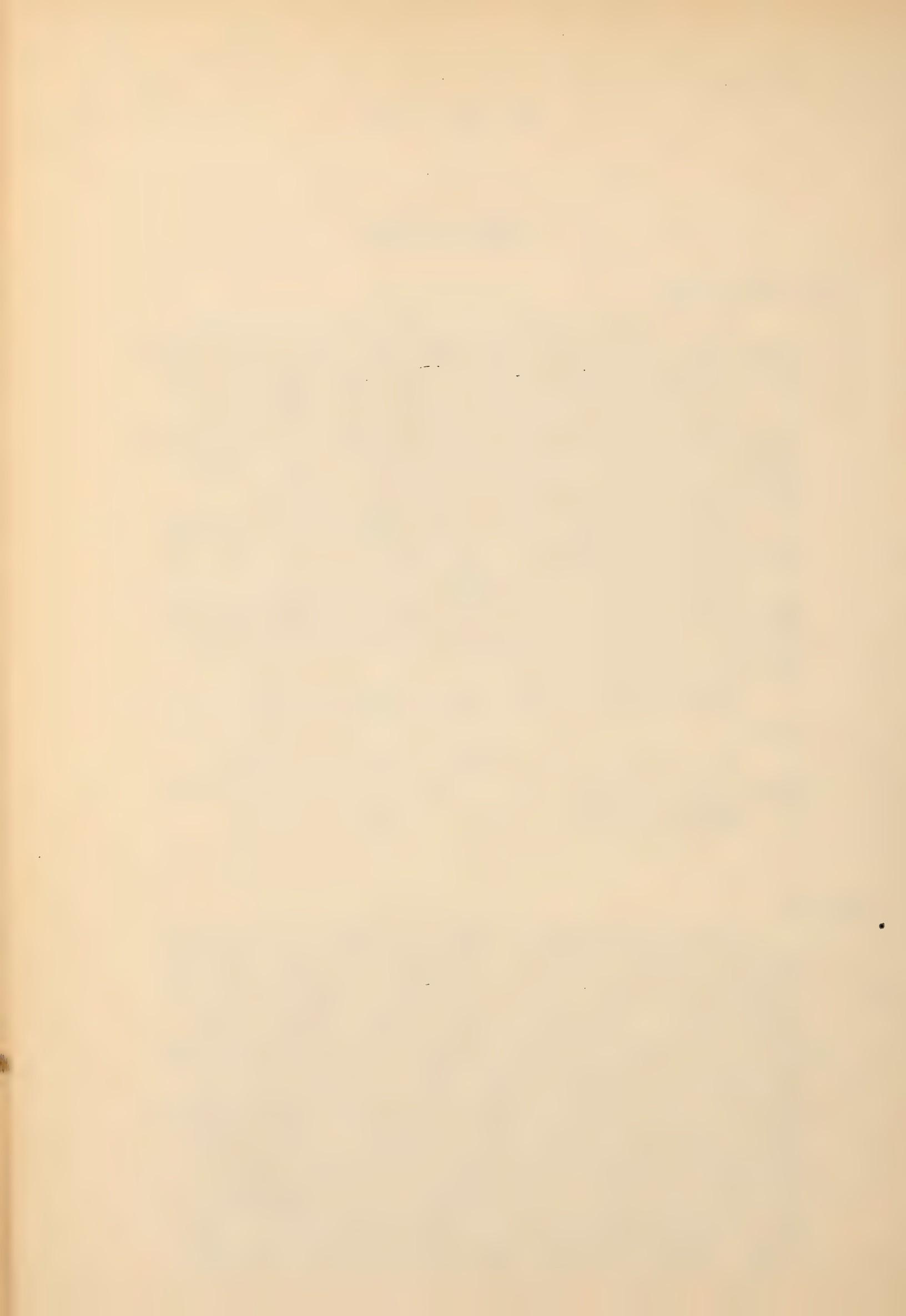
A25 was furrowed in preparation for planting dates.

The digging and transplanting of seedling dates from nursery A14₃ to the west farm road #10 was begun Saturday.

Twenty-five acres were irrigated June 9.

Huntley.

During the week of June 13 alfalfa in fields A and K was harvested. The alfalfa crop has been damaged somewhat by the pressure of great numbers of greenish worms known as alfalfa looper or measuring worm. This pest, according to Mr. J. R. Parker, Entomologist of the Montana State Station, who visited the farm and a part of the project on Wednesday, is quite common in many parts of the country, but has not occurred in such large numbers before as to do any serious damage. The damage resulting to the first crop of hay on most of the project is estimated at from one-fourth to one-third of the crop. The damage is not confined to the alfalfa alone, but as soon as the alfalfa is cut the worms migrate to adjoining fields of other crops, such as beets, corn, and garden truck. As a control measure, separating the alfalfa fields



27 June, 1914.

FIELD NOTES.

Huntley (continued).

from other fields by a small stream of running water and double disk ing and dragging the ground thoroughly after the hay is removed seems to be very effective and is being practised by most of the farmers where the pest appeared. It is likely that no very serious damage will result to other crops than alfalfa.

Prof. Atkinson, of the Montana State Station, visited the Farm on Friday.

Beets were cultivated and all plats excepting V-22, CC., were thinned.

Potatoes were harrowed.

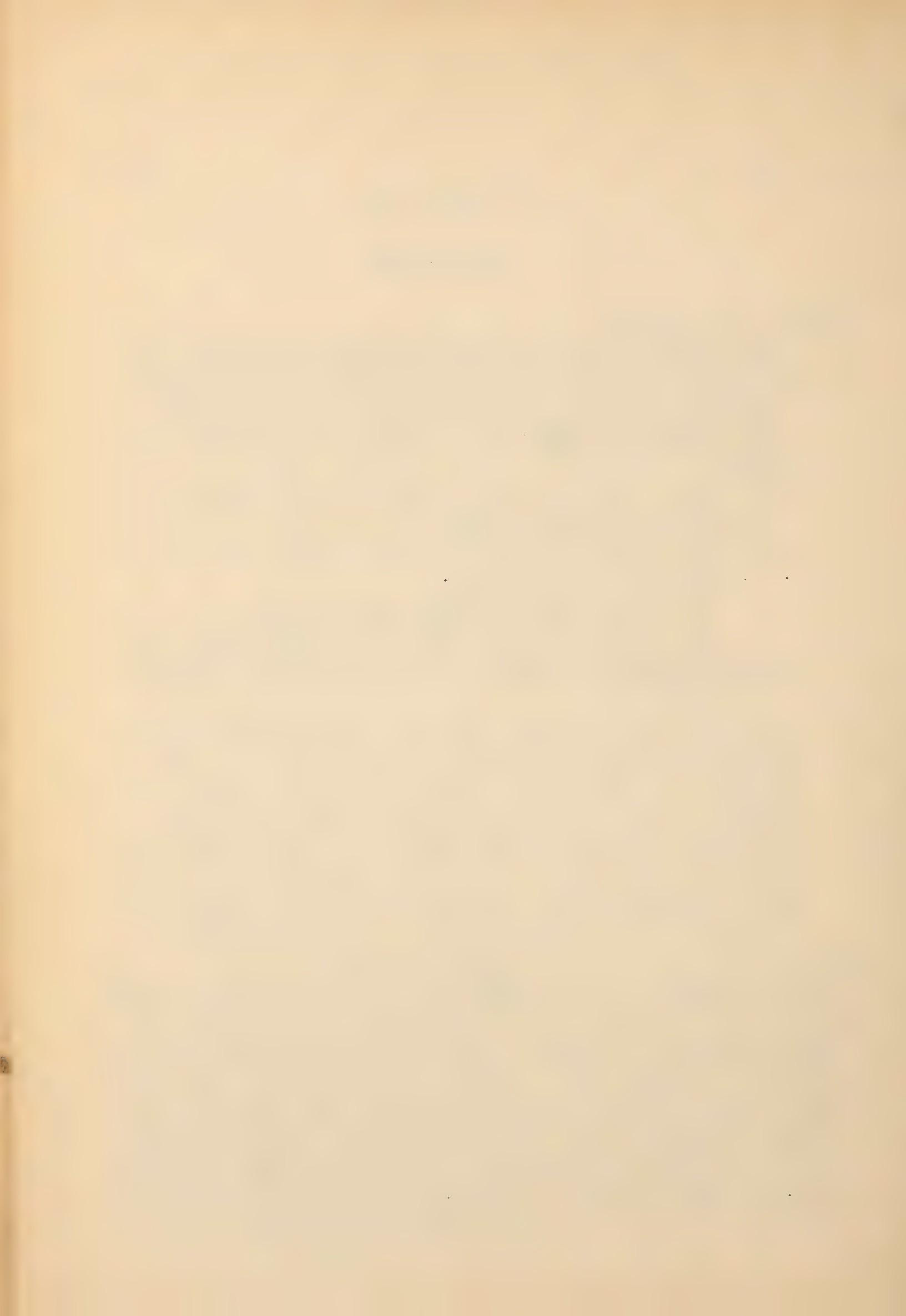
Corn plats were harrowed and thinned.

All alfalfa was cut the latter part of the week.

The remainder of the time was spent on the irrigation system, hoeing weeds, plowing and dragging headlands, etc.

A continuation of the work was carried on to determine the relation between color variation and moisture content of wheat plats in Field K. The plats compared in this report as, 3, 17, and 23, of Series V. Plat 3 was uniformly a dark, vigorous green, 17 was a very light green, while 23 varied somewhat, the lower one-third of the plat being dark and the remainder of the plat a light green with a few dark areas about 2 feet in diameter. The method of sampling was: Six regular cores at depths of 6 inches, 1 foot, and 2 feet. The results are as follows:

Plat.	Treatment.	Depth	Per cent Moisture.						Aver.
			1	2	3	4	5	6	
V3	2 yr.rotation with beets	6"	23.1	18.0	14.4	22.0	14.8	20.4	18.8
V17	2 yr.rotation with oats	6"	15.4	14.5	17.8	17.2	15.5	18.7	16.5
V23	Wheat continuous crop.	6"	16.3	14.0	17.4	15.7	15.1	11.6	15.0
V3	2 yr.rotation with beets	12"	27.6	20.2	18.6	23.0	19.0	21.6	21.7
V17	2 yr.rotation with oats	12"	21.9	21.8	21.0	21.6	21.3	28.2	22.6
V23	Wheat continuous crop.	12"	16.5	16.6	16.9	20.1	18.9	16.0	17.5
V3	2 yr.rotation with beets	24"	16.1	17.4	18.6	19.2	19.7	18.1	18.2
V17	2 yr.rotation with oats	24"	24.1	23.0	25.0	21.0	25.7	27.5	24.4
V23	Wheat continuous crop.	24"	16.0	22.2	17.5	16.2	20.3	19.7	18.6



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FIELD NOTES.

Huntley (continued).

Average of all depths.

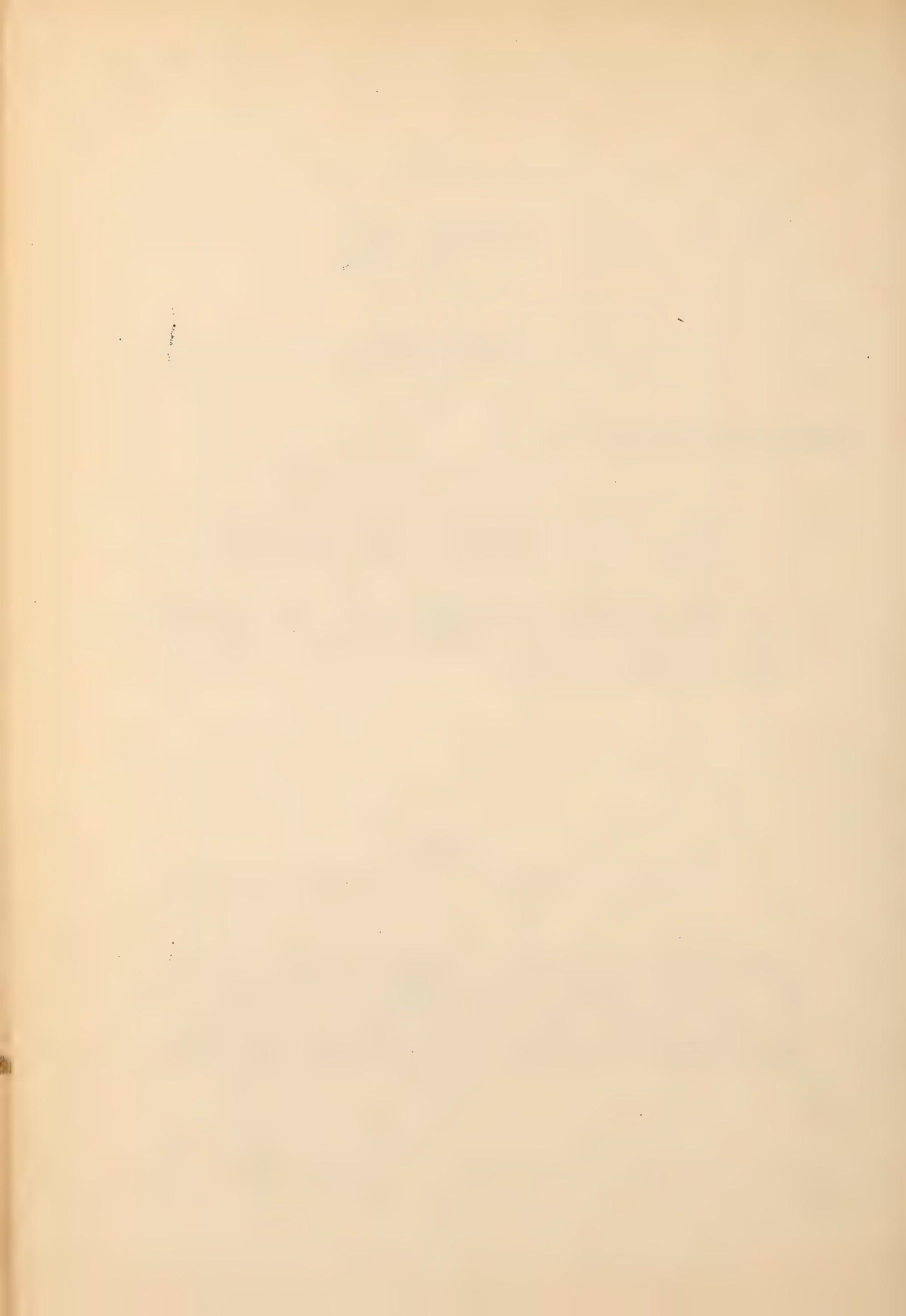
V-3	19.6	— Grain a dark green color.
V-17	21.2	— Grain a very light green.
V-23	17.0	— Grain varying shades of green.

Plat V-17 has the highest per cent moisture. Plats V-3 and 23 had less moisture than V-17 and were darker in color. The difference, however, was small in all cases.

PERSONAL.

Mr. Farrell returned to Washington June 19.

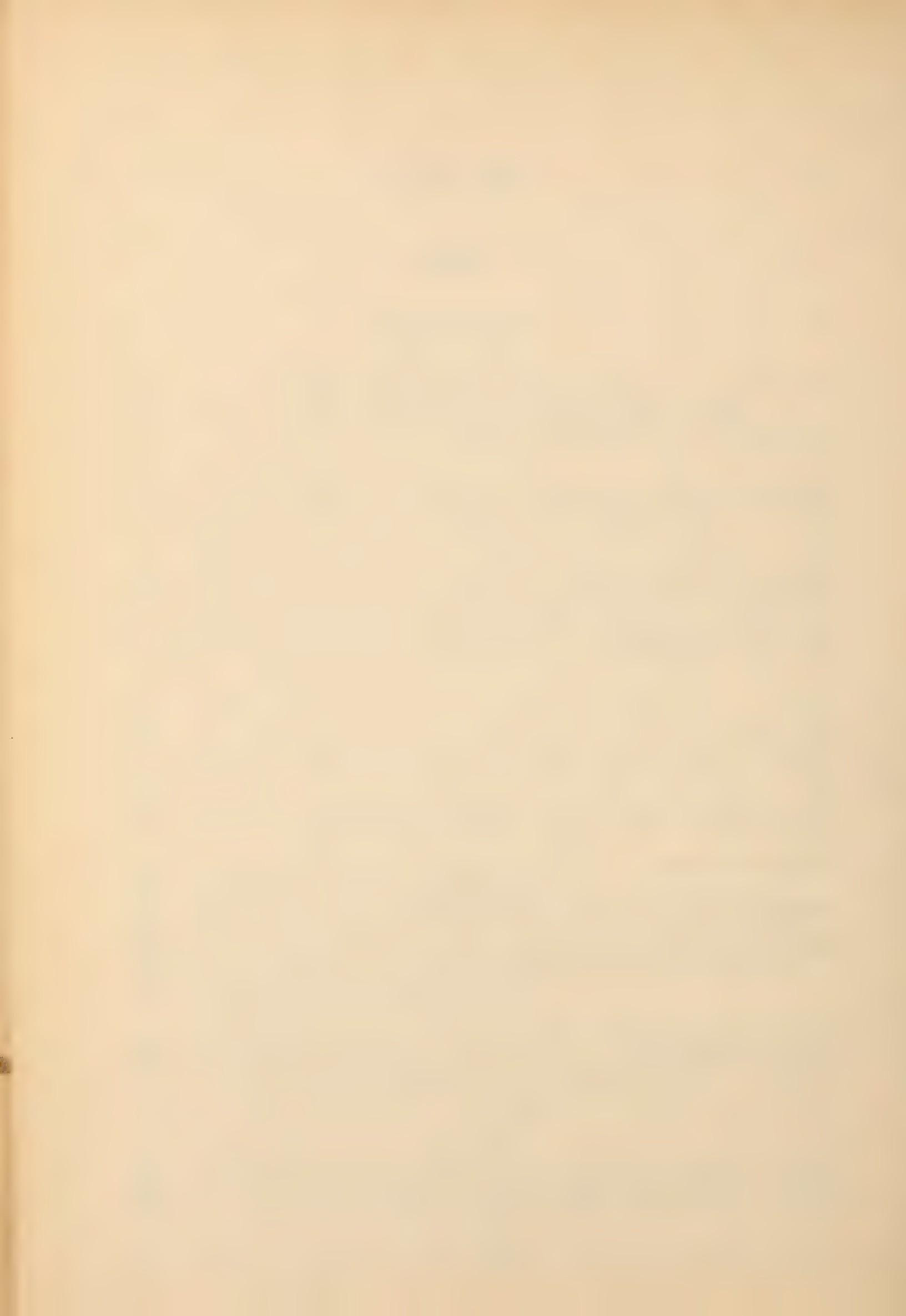
Mr. Scofield left on the 22nd for a short trip to England and the Continent in the interest of the long-staple cotton marketing propaganda. He is accompanied by Mr. Fred Taylor, of the Office of Markets, and Mr. W. S. Dorman, President of the Mesa (Ariz.) Egyptian Cotton Exchange.



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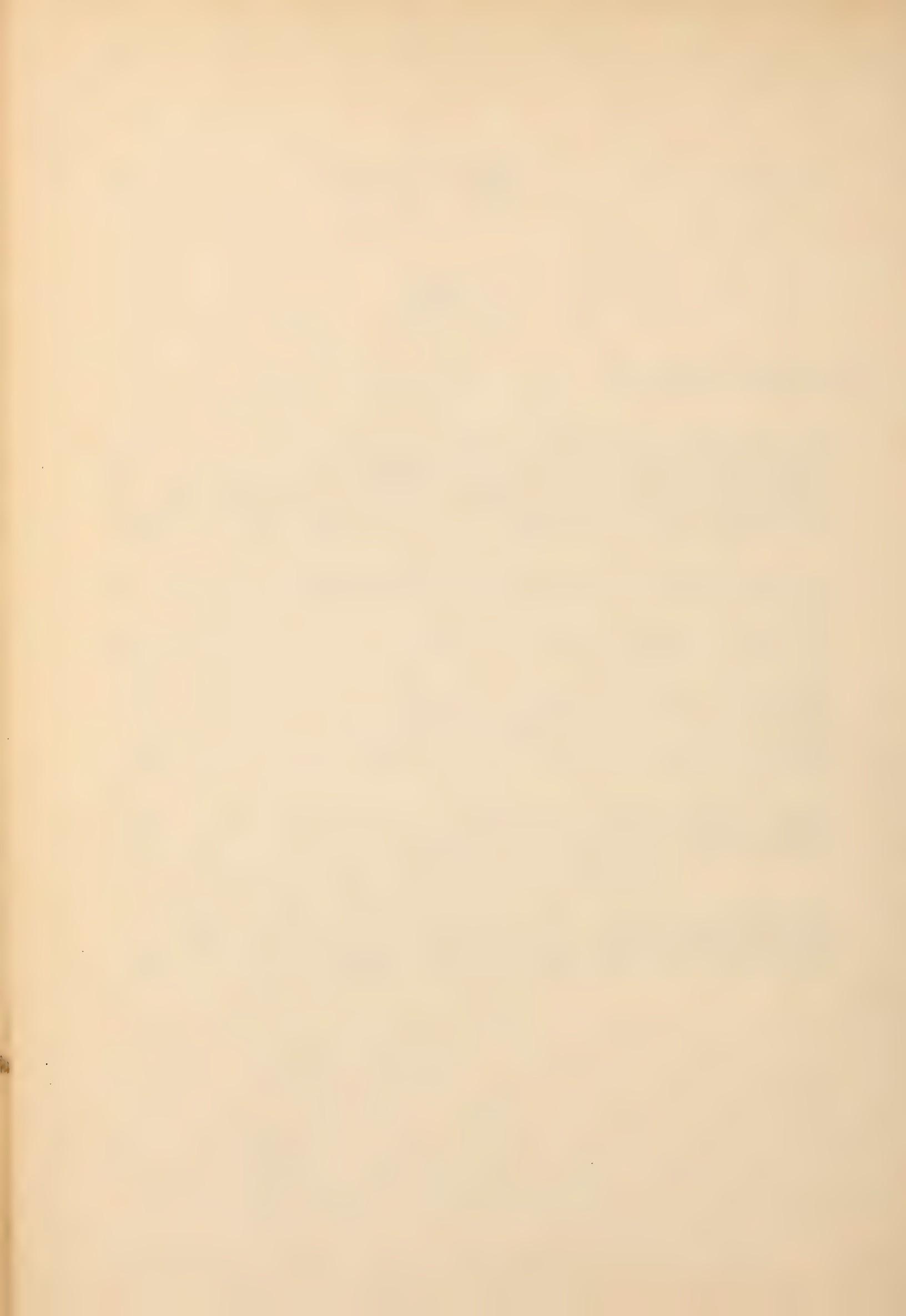
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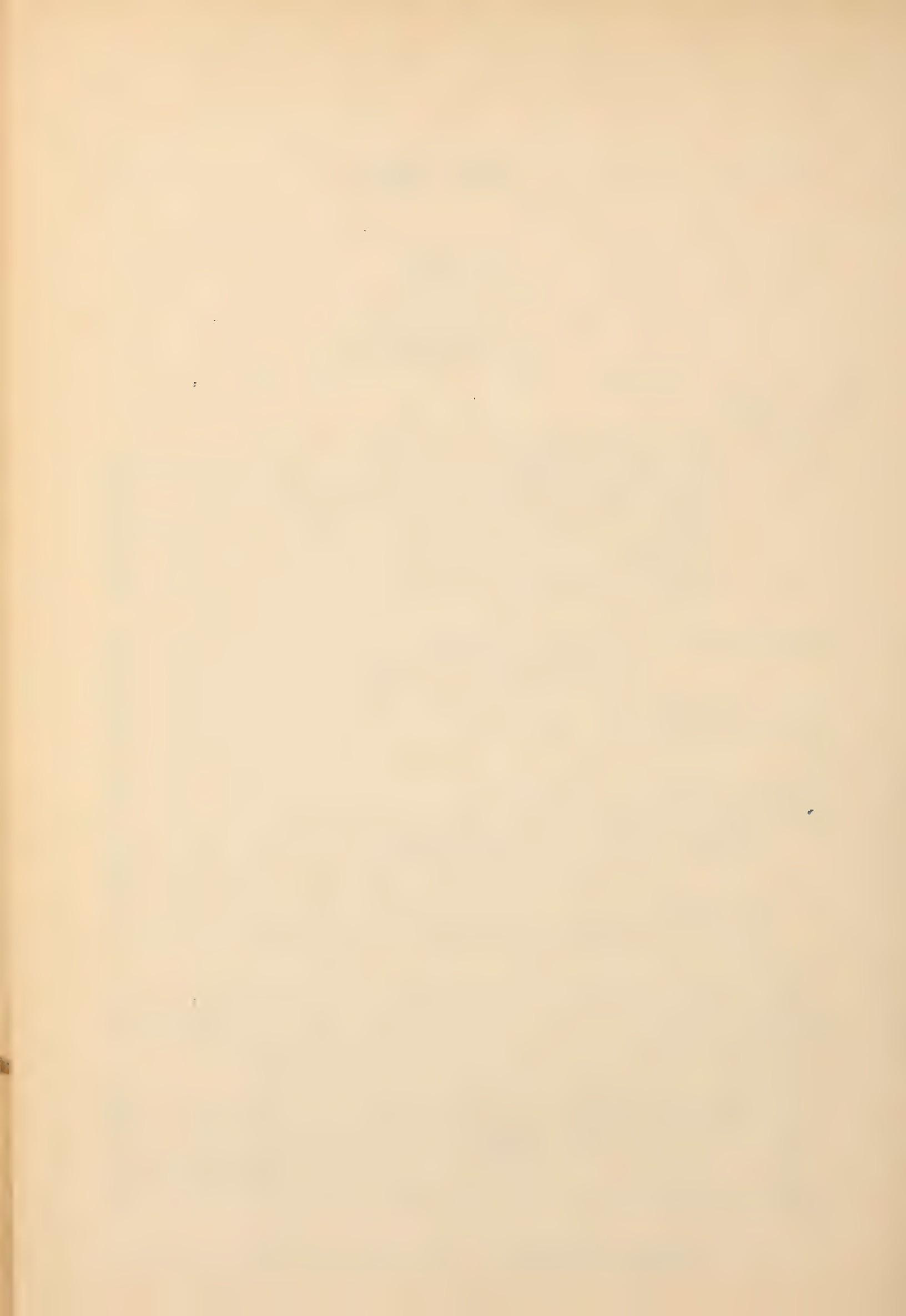


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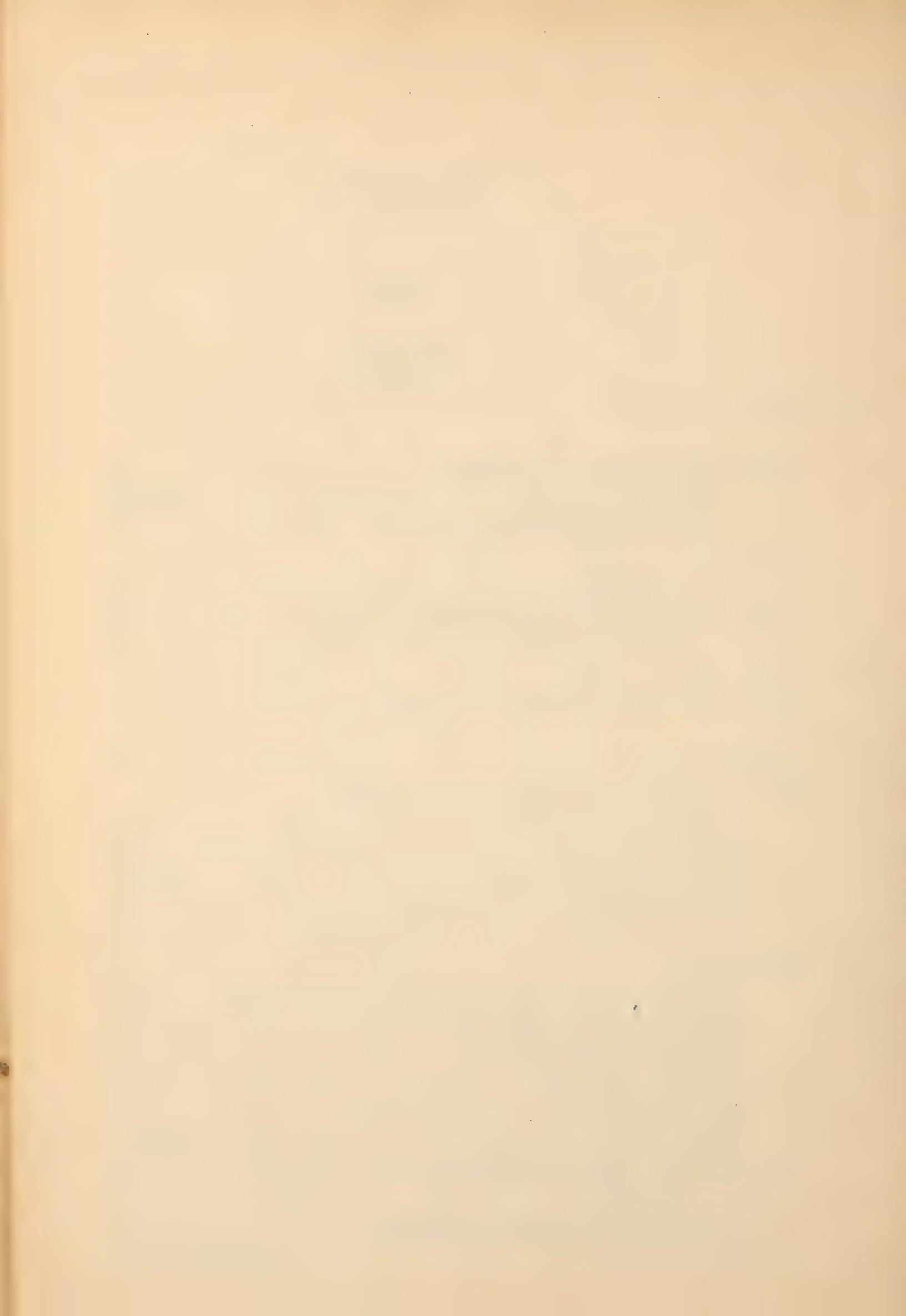


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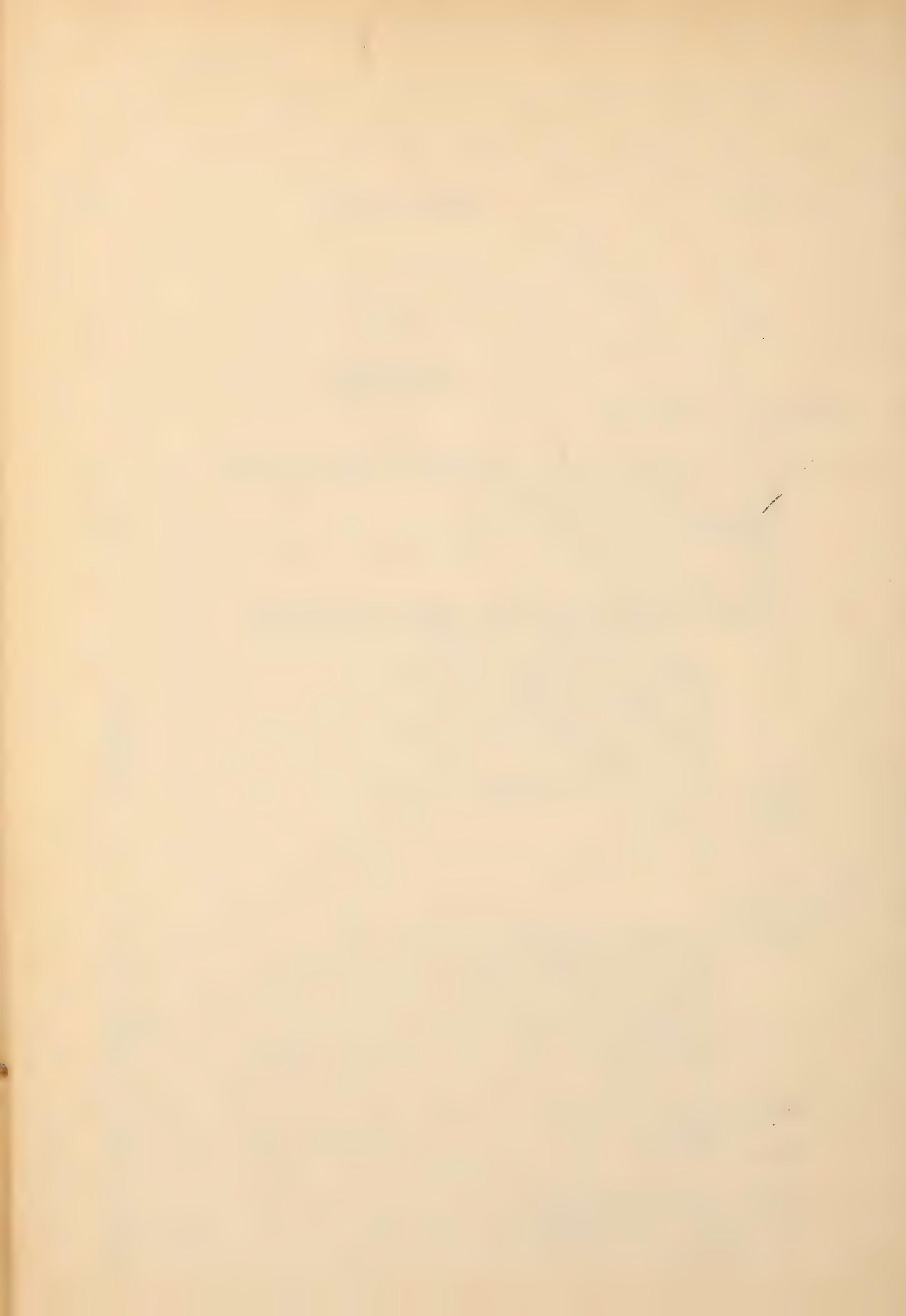
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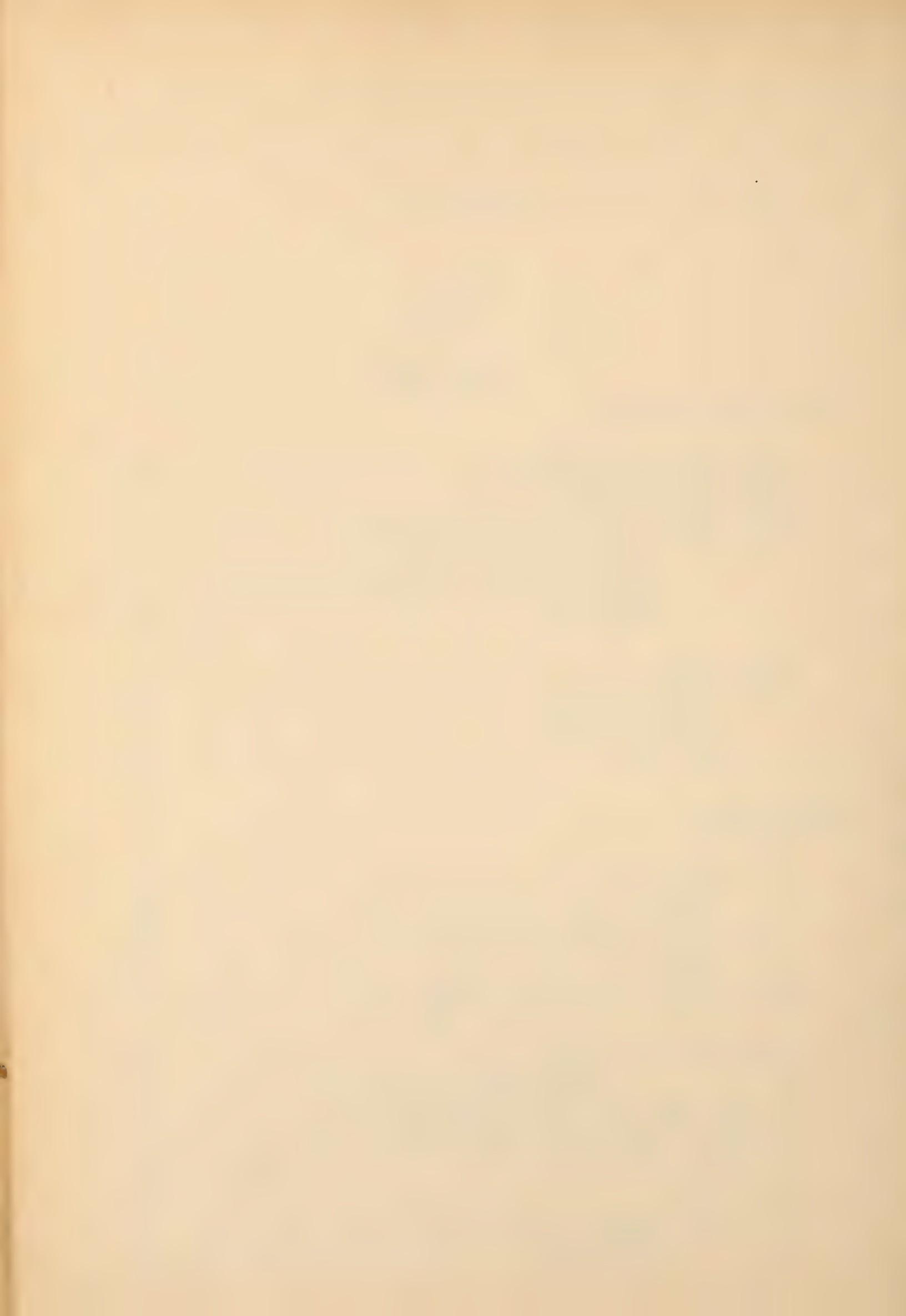
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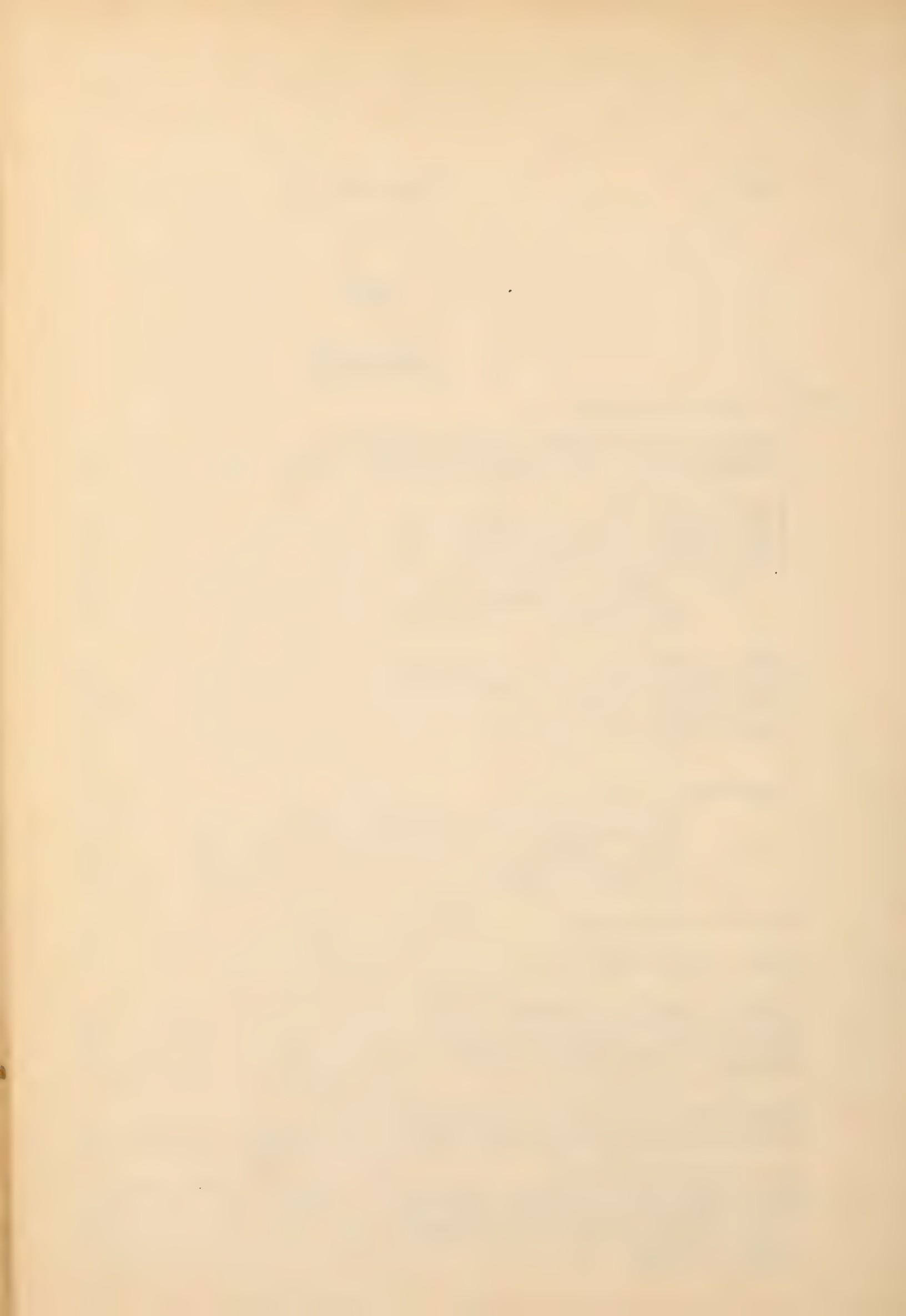


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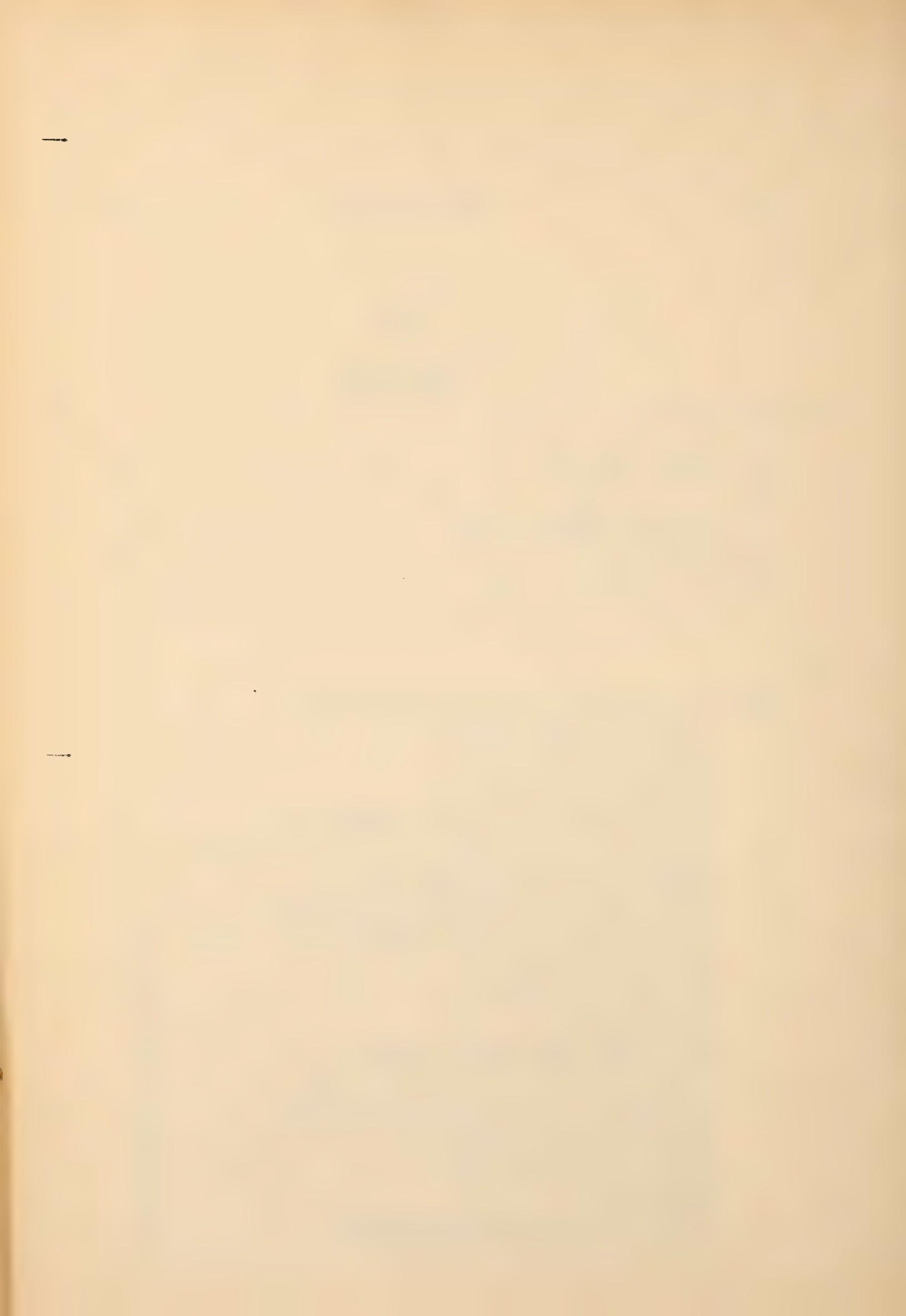
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